# Working Papers in Environmental Social Sciences

## Monitoring and Evaluation of a Large-Scale Hand-washing Campaign in India: Preliminary Results of the Evaluation Study of “The Great WASH Yatra”

Elisabeth Seimetz and Hans-Joachim Mosler

**Working Paper 2013-03**

eawag
aquatic research

**Working Papers in Environmental Social Sciences**

Department of Environmental Social Sciences
Eawag: Swiss Federal Institute of Aquatic Science and Technology
Überlandstr. 133
8600 Dübendorf
Switzerland
http://www.eawag.ch/forschung/ess

## Recommended Citation

Seimetz, Elisabeth and Mosler, Hans-Joachim (2013): Monitoring and Evaluation of a Large-Scale Handwashing Campaign in India: Preliminary Results of the Evaluation Study of “The Great WASH Yatra”. Working Papers in Environmental Social Sciences 2013-03, Department of Environmental Social Sciences, Eawag: Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland.
http://www.eawag.ch/forschung/ess/workingpapers/

## Author Information

Elisabeth Seimetz is a PhD student in Psychology at Eawag. Her research interests include behaviour change, health and social psychology, and public health interventions in developing countries.

Hans-Joachim Mosler is Head of the “Environmental and Health Psychology” Cluster at the department of Environmental Social Sciences at Eawag and Associate Professor of Social Psychology at the University of Zurich. His research focuses on behaviour change in the water and sanitation sector and on the diffusion of innovations in this sector.

## Author Contact

Eawag, Überlandstr. 133, 8600 Dübendorf, Switzerland
elisabeth.seimetz@eawag.ch
http://www.eawag.ch/about/personen/homepages/seimetel/index

eawag
aquatic research

# The Great WASH Yatra: Monitoring and Evaluation of a Large-Scale Handwashing Campaign in India

## Interim Report: Preliminary Results of the Evaluation Study

Elisabeth Seimetz
Hans-Joachim Mosler
Duebendorf, March 2013

# Table of Contents

# Executive Summary

This report presents the preliminary results of Eawag’s evaluation study of “The Great WASH Yatra” (TGWY). To evaluate the effects of the campaign on handwashing with soap, three different surveys were conducted:

1. Household surveys assessing handwashing behaviour and behavioural determinants affecting handwashing with soap before and after the campaign.
2. The WASH in Schools training assessment, which included surveys as well as observations of school facilities before and after the training sessions.
3. The TGWY carnival visitors’ survey, in which visitors were interviewed before and after their visit to the carnival.

## Household Surveys

- The differences found between visitors and non-visitors to TGWY were mostly insignificant for both handwashing behaviour and behavioural determinants of washing hands with soap. At follow-up, four out of sixty items were shown to have increased more in the visitors than in the non-visitors group. Observed effect sizes were small.
- Behavioural determinants which should have been targeted are (1) nurture, disgust, other family members’ handwashing behaviour, response efficacy, and personal commitment for stool related handwashing behaviour and (2) attractiveness, descriptive norm, and personal norm for food related handwashing behaviour.
- Food related handwashing frequencies were lower than those of stool related handwashing during the baseline survey and hence should have received particular attention.
- The current findings emphasise the importance of planning enough time between baseline and campaign designs so as to meaningfully incorporate important findings into the development of interventions. Considering the major delays in the project launch and short-term changes in the selection of the carnival sites, the results of the baseline survey could not serve as a basis for designing promotion activities.
- The target audience of the present Eawag evaluation survey were primary caregivers of children under the age of five, which was not a group particularly targeted by TGWY. Future campaigns aiming at long-term behaviour change in handwashing practices should ensure that women and caregivers play an active role in the project, since they are in most cases the household food preparers and the ones responsible for taking care of children and their sanitation needs.

## WASH in Schools Training Assessment

- No effect was found of the WASH in Schools (WinS) training sessions on self-reported handwashing frequencies or on behavioural determinants for handwashing.
- A month after the campaign, most of the children from WinS schools recalled the core messages of the WinS training. In both WinS and control schools, the majority of the children knew about the importance of using toilets for defecation and soap for handwashing.
- In almost all schools, water was available in the school grounds. In half of the schools, soap was available before lunch. As reported by the children, soap was not available for use on a regular basis in any of the schools. In a third of the schools, it was obvious that children practiced open defecation. No major differences were observed from baseline to follow-up.
- In one out of ten intervention schools surveyed (stops two to four), a tippy tap without water and without soap was found at follow-up.

## TGWY Carnival Visitors Survey

- Visitors to TGWY liked the carnival very much. The different labs as well as the film about hygiene received good responses from the visitors.
- Several behavioural determinants changed immediately after the visit: perceived severity of diarrhoea, knowledge about the causes of diarrhoea and on how to prevent the disease, influence of important people’s opinion on handwashing with soap, and useful alternatives when there is no soap available for handwashing.

## Recommendations

- The most important target group should be mothers and caregivers since they are the ones who take care of small children who are most vulnerable to morbidity and mortality from diarrhoea.
- The campaign should be restricted to a few interactive games with a focus on the relevant behavioural determinants for handwashing with soap.
- Ensuring the presence and maintenance of the necessary sanitary facilities in schools is of paramount importance. This should be the responsibility of adults. Failure to implement and maintain this responsibility will result in very little to no change in the current situation of handwashing with soap as well as in the use of toilets.

# Overview

## Introduction

On behalf of the Swiss Agency for Development and Cooperation, WASH United was selected as lead agent to implement a large-scale handwashing campaign in India. “The Great WASH Yatra” (TGWY) was a campaign to promote life-saving handwashing behaviour and raise the importance of sanitation and hygiene among different target groups in India. The campaign was led by WASH United and Quicksand and took place in six different villages between Maharashtra and Bihar from 3 October until 19 November 2012. The collaboration with Eawag was envisaged to support and strengthen WASH United’s experience in field implementation. Eawag’s added value to the project is a structured scientific evaluation of all implemented measures and their effectiveness in terms of outcomes, using a solid scientific approach on the topic of behaviour change and handwashing practices.

## Theoretical Background of the Evaluation Study

Key goals of TGWY were to promote life-saving handwashing behaviour among children and adolescents and to raise the importance of sanitation and hygiene among different target groups in India. Behaviour is always the result of psychological processing of factors within the individual. The framework for analysing the different determinants favourable to the new behaviour was based on the RANAS model[1]. The model contains five blocks of factors, which are conceptualised to be the main drivers of behaviour and habit formation: risk, attitudinal, normative, ability, and self-regulation factors.

- **R**isk factors entail perceived vulnerability and the perceived severity of contracting a disease, and factual knowledge about the possibility of being affected by a potential contamination.
- **A**ttitude factors comprise instrumental beliefs about the costs and benefits of the targeted behaviour, as well as affective beliefs, i.e. feelings that arise when thinking about the behaviour.
- **N**orm factors include different social influences: descriptive norms (behaviours typically performed by others), injunctive norms (behaviours typically approved or disapproved by others) and personal norms (personal standards, what should be done).
- **A**bility factors indicate people’s perceptions about performing a behaviour (perceived behavioural control) and the confidence in one’s ability to organise and manage the targeted behaviour (self-efficacy).
- **S**elf-regulation factors help to manage conflicting goals and distracting cues when intending to implement and maintain certain behaviour. Important determinants are commitment, perceived habit and remembering behaviour.

[1] Mosler, H.-J. (2012). A systematic approach to behavior change interventions for the water and sanitation sector in developing countries: A conceptual model, a review, and a guideline. *International Journal of Environmental Health Research, 22*(5), 431-49.

## Components of the Study

To evaluate the different campaign activities, a comprehensive survey was conducted with baseline, on-site, and follow-up data collections on handwashing behaviour (see Figure 1).

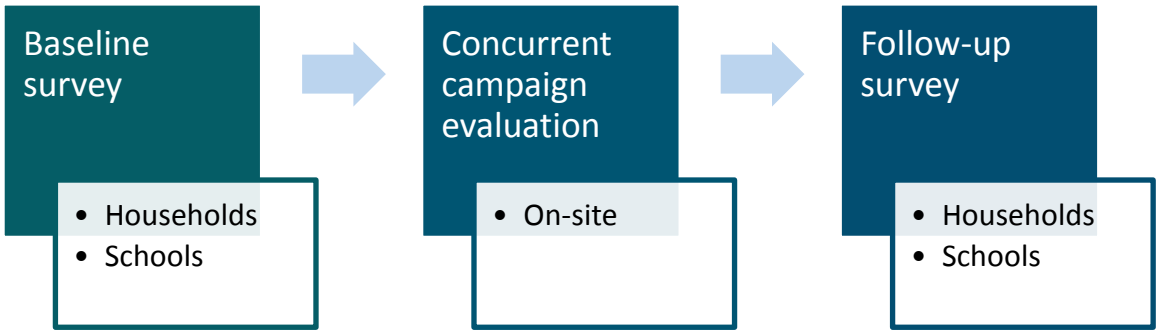


*Figure 1.* Components of the evaluation study.

### Household Surveys

Baseline household surveys were meant to identify the most influential behavioural determinants for triggering handwashing with soap at key times. Considering the major delays in the project launch and selection of the carnival sites, the results of the baseline survey could not serve as a basis for designing promotion activities. After the campaign, follow-up surveys were carried out to evaluate the effectiveness of the promotion activities. The main target behaviour within the surveys was safe handwashing at key times. The main target group was primary caregivers within a household, i.e. the person responsible for food preparation and child care. Only households with a child below the age of five were selected. The same caregivers were interviewed and observed before and after implementation of the campaign.

### Evaluation of the WASH in Schools Training Sessions

Classroom surveys and observations of students’ handwashing behaviour were conducted in order to identify if and why students wash or do not wash their hands with soap and water. To effectively evaluate the impact of the WASH in Schools programme on students’ handwashing practices, surveys were conducted before and after the WASH in Schools training sessions. Data was also collected in schools where no training took place. These schools served as control schools.

### On-Site Evaluation of “The Great WASH Yatra”

To concurrently evaluate the impact of the campaign and to assess the participants’ immediate responses, visitors to TGWY carnival were interviewed before and after their visit.

## Objectives of the Study

The overall objective of the evaluation study was to optimise the hygiene campaign run by WASH United and to further improve the mobilisation of the communities to protect their health and well-being. The following goals were targeted: (a) identification of the most influential behavioural determinants for triggering handwashing with soap at key times and (b) identification of the promotion activities that are most effective in changing behavioural determinants and thus behaviour. The focus of the evaluation study was on handwashing at key times. The study will enhance project outcomes and specifically strengthen the knowledge gained on effectiveness of measures as well as disseminate these results to the wider public. The aim is to increase the effectiveness of hygiene promotion campaigns worldwide and to significantly and positively impact on the health of the most vulnerable and poorest segments of the human population.

# Household Surveys

## Methods

**Design.** A panel survey design was used for the evaluation study, meaning that the same persons and households were interviewed and observed before and after the campaign. A randomised controlled trial could not be applied, because the respondents that eventually attended TGWY could not be selected randomly. A quasi-experimental design was used to determine the differential effectiveness of the promotion activities.

**Survey procedures.** In both panels, data on handwashing practices in households were collected through face-to-face interviews lasting 40-50 minutes and by early-morning observations of three hours’ duration. The main target group of the household surveys was the primary caregivers within a household, i.e. the person responsible for food preparation and child care. In addition to sociodemographic variables, the structured questionnaires contained questions about behaviour and about behavioural determinants regarding safe handwashing: perceived health risks, instrumental and affective attitudes, social norms, perceived personal abilities, and behavioural maintenance factors. Proxy indicators for handwashing with soap were observed (see questionnaire items in the household survey in Appendix E in a separate file). All respondents that participated in the baseline study were informed about TGWY campaign and given flyers. Signed informed consent was obtained from all respondents. The study protocol was approved by the ethical review committee of the Faculty of Arts, University of Zurich.

*Study areas.* The surveys of the present study were limited to three of the six districts where TGWY had its stops: Gwalior (Madhya Pradesh), Indore (Madhya Pradesh), and Kota (Rajasthan). Recruited households were located in small villages surrounding the actual Yatra compound. The villages were selected according to their proximity to, and accessibility from, the Yatra compound to raise the probability of respondents attending the Yatra campaign. The aim was to cover every household that had a child of less than five years of age.

*Data collection.* Both the baseline and follow-up data were collected within a 30 day period. The baseline survey took place in August / September 2012. Follow-up interviews were conducted about a month after the campaign in November / December 2012. For each survey period, eleven interviewers with a Master’s degree in social sciences or humanities were recruited and they participated in a four-day training session. The focus of the training was on the objectives and methodology of the survey, theoretical background of the questionnaire, and procedures and interpersonal communication in the field. The interviewers became familiar with the questionnaire by reviewing the purpose for each item and by conducting role-plays as well as mock interviews on how to administer the questionnaire and record responses. Each interviewer was given an interviewer’s manual for use as a reference tool in the field.

**Sample size.** Only households with a child under five years of age were included. A total of 2303 interviews were conducted: 1145 during the baseline survey and 1158 during the follow-up survey. Follow-up data was obtained from 1015 (89%) of the initial households. During data entry and cleaning, 26 records were eliminated because of missing data on the dependent variable. A final sample of 989 households constituted the study group for analyses. One hundred and thirty-nine of the surveyed

caregivers attended TGWY; 850 non-visitors formed the control-group. During the baseline data collection, observations on handwashing practices took place in 186 households. A total of 183 households were observed during the follow-up survey. One hundred and thirty-nine (75%) of the original caregivers were observed during the follow-up round, out of which only 17 visited TGWY, resulting in a sample size that was too small to permit analyses of differences between visitors and non-visitors.

**Statistical analyses.** To assess the effect of the Yatra on behavioural determinants and on self-reported handwashing behaviour, two-way repeated measures analyses of variance were calculated with time (baseline and follow-up) and group (Yatra visitors and non-visitors) as independent variables. The interaction term was the variable of primary interest for detecting significant differences in changes in the two groups between baseline and follow-up. In a sample as large as in this survey, even small effects can be statistically significant. Partial etas squared were calculated as indices of strength that are independent of sample size, with .01, .06, and .14, respectively, qualifying as small, medium and large effect sizes. For the comparisons, the alpha level was set at .05. *P* values were adjusted using the Bonferroni correction since a large number of comparisons were carried out. Binomial tests were used to test for differences in follow-up characteristics between the visitors and the non-visitors group for categorical variables. To reduce the different situations of self-reported handwashing behaviour down to a few dimensions, a principal component analysis was conducted to determine key situations of handwashing. Multiple linear regression analyses were used to identify behavioural determinants significantly associated with self-reported handwashing behaviour. Relative proportions of responses were worked out as percentage values. Two-tailed statistics were used throughout the study. All statistical analyses were performed using IBM SPSS Statistics 20.

# Findings

## General Characteristics of the Sample

Of the 989 respondents, 98% were female. Participant ages ranged from 17 to 80 years with the majority of participants aged between 21 and 30 (80%) (*M* = 26.9 years, *SD* = 7.2). Most primary caregivers were married (95%), 2% were widowed, and the remaining respondents were either single, cohabiting, or divorced or separated. Thirty-four per cent of the interviewees had never attended school, 10% completed one to four years of schooling, 32% had completed five to eight years, 18% had completed 10 to 12 years, and 4% had completed a high school degree or higher. The majority were Hindu (89%), followed by Muslims (9%).

## Differences Between Baseline and Follow-Up in Yatra Visitors and Non-Visitors

### *Self-reported Frequencies of Handwashing Behaviour*

**Baseline versus follow-up.** At baseline, caregivers reported that they wash their hands with soap more than half of the time before eating (*M* = 3.18, on a scale from 1 to 5), before feeding a child (*M* = 2.95), before cooking (*M* = 3.20), and after other kinds of contact with faeces (*M* = 4.21). The caregivers also stated that they wash their hands with soap always or almost always after defecation (*M* = 4.47), and after wiping a child’s bottom (*M* = 4.40). The respondents reported washing their hands less than half of the times before breastfeeding a child (*M* = 2.29) and before handling drinking water (*M* =

2.47). At follow-up, Yatra visitors as well as non-visitors reported significantly higher frequencies of handwashing behaviour before eating, before breastfeeding, before feeding a child, before cooking, and before handling drinking water (see Table A1 in Appendix A) than at baseline. Mean increases of 0.33 to 0.93 on a scale from 1 to 5 were observed in both groups. No increases were observed with regard to reported handwashing behaviour after defecation, after wiping a child’s bottom, or after other kinds of contact with faeces.

**Baseline versus follow-up between visitors and non-visitors.** No significant differences were found in the increases of reported handwashing rates between Yatra visitors and non-visitors (see Table A1 in Appendix A), meaning that self-reported frequencies of handwashing at key times did not increase more in the visitors than in the non-visitors group.

### *Behavioural Determinants Explaining Behaviour Change*

**Baseline versus follow-up.** Means and standard deviations of the behavioural determinants for Yatra visitors and non-visitors at baseline and follow-up are displayed in Table A2 in Appendix A. Comparing baseline and follow-up scores, significant increases were observed in the majority of the items in both groups. Effects are considered to be small to large with partial etas squared ranging from .013 to .183. The mean differences in item scores ranged from 0.16 to 1.17 on a scale from 1 to 5.

**Baseline versus follow-up between visitors and non-visitors.** Four items significantly increased more in the visitors than in the non-visitors group (“Perceived risk of getting diarrhoea”, “Causes of diarrhoea” “Feeling guilty when not washing hands with soap before handling food”, “Committed to washing hands with soap before handling food”). The mean differences between visitors and non-visitors in item score increases ranged from 0.49 to 0.68 on a scale from 1 to 5 (see Table A2 in Appendix A). Effect sizes were small with partial etas squared ranging from .012 to .017.

### *Presence of Soap as a Proxy Measure for Handwashing Behaviour*

At baseline, soap was found in 67% of all households. At follow-up, soap was observed in 83% of the households. In 80% of the households where no soap was observed at baseline, soap was found at follow-up. This increase in the presence of soap from baseline to follow-up proved to be significant. No differences were found between Yatra visitors and non-visitors. More soap at follow-up was thus observed equally in the visitors and in the non-visitors group.

### *Latrine Use*

At baseline, 52% of respondents indicated using a latrine for defecation, 46% said they practice open defecation. At follow-up, 56% reported using a latrine and 43% indicated practicing open defecation. Of the respondents that reported practicing open defecation at baseline, 25% indicated using a latrine at follow-up. This increase in latrine use from baseline to follow-up was significant. However, the increase could not be associated with a visit to the TGWY. Latrine use thus increased equally in the visitors and in the non-visitors group from baseline to follow-up.

## Behavioural Determinants for Handwashing Behaviour at Baseline

### *Key Handwashing Situations*

A principal component analysis was conducted to test if handwashing with soap at different key times forms a single behaviour or if there are differences depending on the situation. The analysis suggested that a two-factor solution best explained the data. The first factor can be summarised as being food related. It incorporates handwashing before eating, before preparing food, before feeding a child, before breastfeeding, and before handling drinking water. Items loading on the second factor were stool related. This factor includes handwashing after defecation, after wiping a child’s bottom, and after other kinds of contacts with faeces. To facilitate further analysis, two mean scores were computed representing the two factors. While stool related handwashing with soap was very common ($M$ = 4.28, on a scale from 1 to 5), food and water related handwashing with soap was conducted only sometimes ($M$ = 2.80, on a scale from 1 to 5). These factor scores were used as the outcome variables in the subsequent regression analyses.

### *Behavioural Determinants Explaining Stool Related Handwashing Behaviour*

Behavioural determinants that influenced self-reported handwashing behaviour related to stools were identified by means of regression analysis (see Table B1 in Appendix B). Five behavioural factors had a significantly positive impact on stool related handwashing:

- **Nurture**: Thinking that not washing hands with soap is risking the health of one’s children.
- **Disgust**: Thinking it is disgusting not to wash hands with soap after using the toilet.
- **Descriptive norm family**: Perceiving other family members as washing their hands with soap.
- **Response efficacy**: Being certain that washing hands with soap prevents diarrhoea.
- **Commitment**: Being committed to washing hands with soap.

Caregivers who scored high on those five behavioural determinants tended to report washing their hands with soap more often after contact with faeces than other respondents.

One significant negative relationship was found. Caregivers who felt more attractive when they washed their hands with soap (attractiveness) reported washing their hands with soap less often after contact with faeces than other respondents. However, the initial simple correlation between stool related handwashing behaviour and attractiveness was positive. Under different circumstances, the correlation between attractiveness and stool related handwashing might thus be either positive or negative, indicating an interaction between the determinants for handwashing behaviour. Further analyses will help to clarify these interactions.

Overall, the behavioural determinants explained 56% of the variance in stool related handwashing with soap, which is considered large. In other words, 56% of the differences in the frequency of self-reported stool related handwashing with soap between respondents can be explained by differences in the behavioural determinants.

### *Behavioural Determinants Explaining Food Related Handwashing Behaviour*

As for food related handwashing with soap, four behavioural factors were identified as possible positive predictors (see Table B2 in Appendix B):

- **Attractiveness**: Feeling attractive when washing hands with soap.
- **Descriptive norm family**: Perceiving other family members as washing their hands with soap.

- **Descriptive norm community**: Perceiving other community members as washing their hands with soap.
- **Personal norm**: Feeling a personal obligation to wash hands with soap.

Caregivers who scored high on those behavioural determinants reported washing their hands with soap more often before handling food than other respondents.

Together, the behavioural determinants explained 68% of the variance in food related handwashing with soap, which is fairly high.

## Campaign-Related Attitudes and Responses

### *Awareness and Promotion of TGWY*

At follow-up, 737 out of 989 respondents (75%) indicated having heard about TGWY. The Eawag survey was the major way participants had heard about the campaign ( 78% of participants). Word of mouth was mentioned by 40% of respondents. Five per cent of the respondents referred to the local municipality. Posters figured as a source of awareness for 5% of the respondents, and auto rickshaws for 4% (see Figure 2).

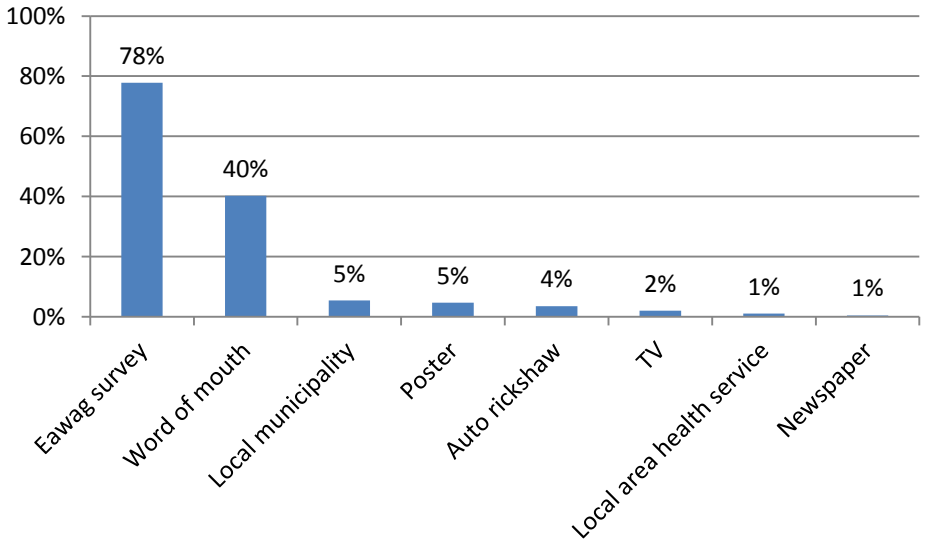


*Figure 2.* Sources of awareness about TGWY in the household surveys.

Respondents were asked if they knew what TGWY was about. Eighty per cent of the respondents mentioned hygiene and sanitation, while 20% mentioned handwashing. Stopping open defecation was mentioned even less, by 18% of the respondents. Ten per cent of the respondents said they did not know what TGWY was about (see Figure 3).

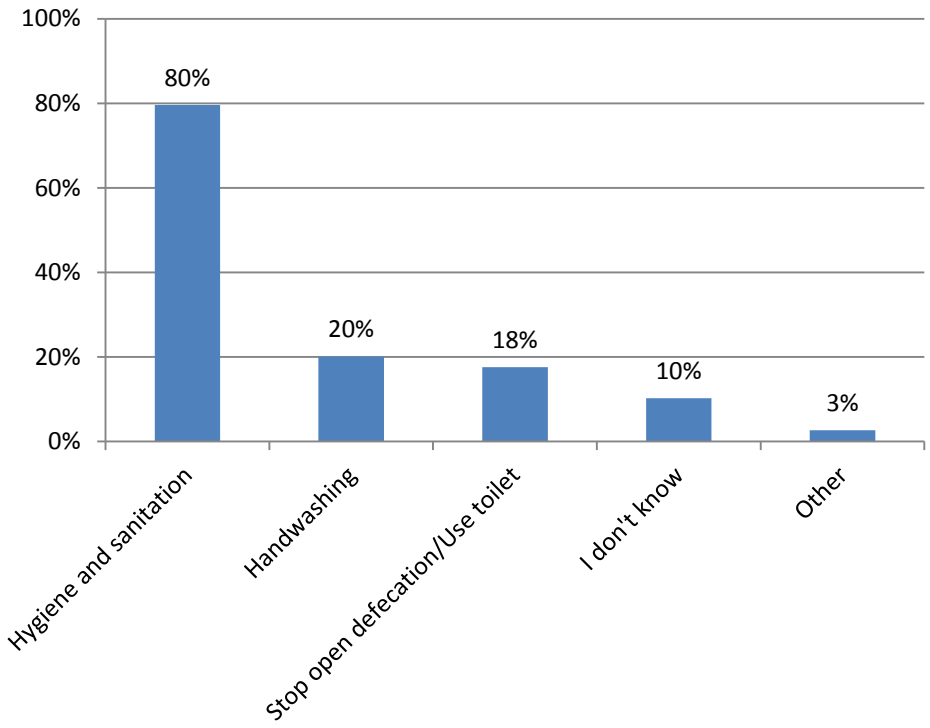


*Figure 3.* Awareness about TGWY topics.

Out of the total matched sample of 989 respondents, 139 attended TGWY (14%). Caregivers that had heard about TGWY, but did not attend, were asked the reason why they did not visit TGWY. Of these, 46% indicated that they did not have time, 19% indicated that they were busy with some kind of work or had to take care of the offspring, followed by 7% who said they were not allowed to go (see Figure 4).

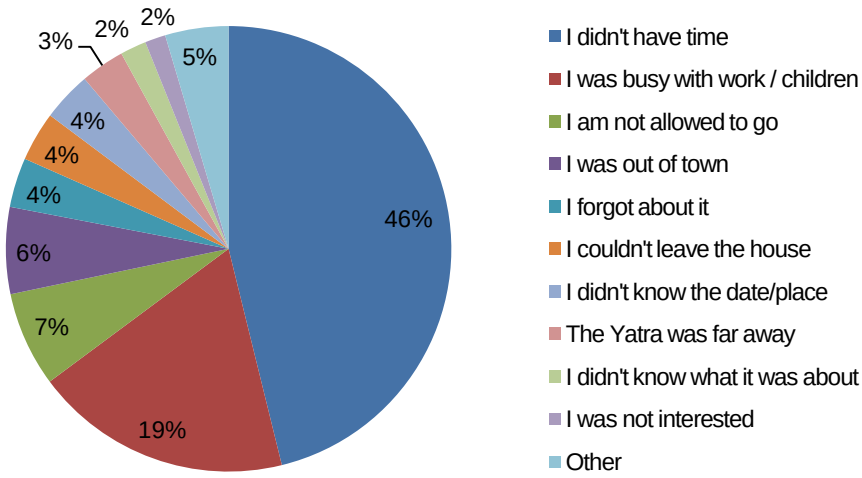


*Figure 4.* Reasons for not attending TGWY.

### *Promotion Activities and Knowledge Transfer*

Of the interviewed caregivers who had visited TGWY, 90% said they liked TGWY. Five per cent quite liked the campaign, 2% neither liked nor disliked it and 3% did not like their visit. Yatra visitors were asked if they remembered any games or activities they watched or participated in (multiple answers possible). Table 1 displays the list of activities respondents watched or participated in. A total of 27% of the visitors remembered having played or watched the germ pyramid, followed by 26% who mentioned the dance contest.

Table 1

*Promotion Activities that Respondents Watched or Participated in*

| Promotion activity | % of respondents who visited TGWY |
|---|---|
| Germ pyramid | 27 |
| Dance competition | 26 |
| Germ attack | 15 |
| Kinect catch the soap game | 14 |
| Menstrual hygiene lab | 12 |
| Soap lab | 12 |
| World toilet cup football game | 11 |
| Musical toilets | 9 |
| Push out the germs (marbles) | 9 |
| Snakes & ladders | 9 |
| Velcro poo in the loo | 9 |
| Poo hoops | 7 |
| Song competition | 7 |
| World toilet cup cricket game | 7 |
| Clean hands challenge | 6 |
| Cricket poo in the loo | 5 |
| Kinect handwashing game | 5 |
| Ludo | 5 |
| Other games and activities | 1-4% each |

Sixty per cent of the surveyed caregivers who visited TGWY did not play any kind of game. That games are only for children was the main reason for not playing a game with 37%, 25% said they were not interested, and 15% mentioned that the queues were too long (see Figure 5).

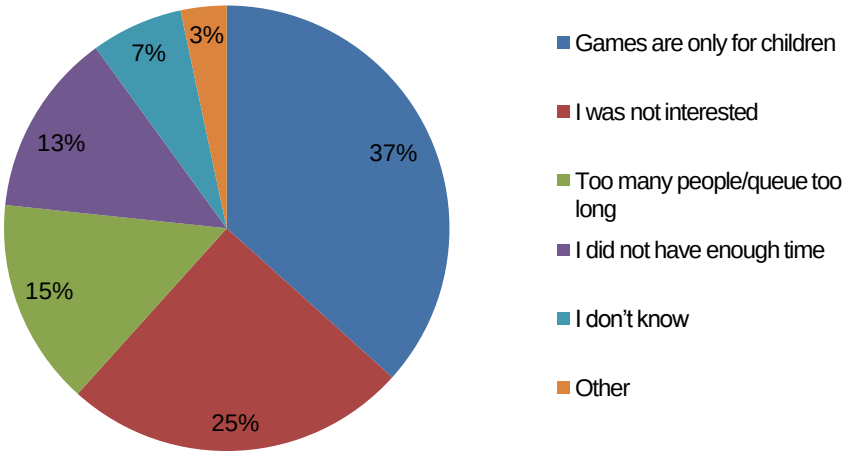


*Figure 5*. Reasons for not playing games.

When asked, what they liked the most about TGWY, 19% mentioned the games, followed by 16% who said they liked everything. Sixteen per cent mentioned they liked the information about cleanliness they received, while 13% liked the dance performances. Nine per cent liked the menstrual hygiene lab the most and 7% the song about hygiene (see Figure 6).

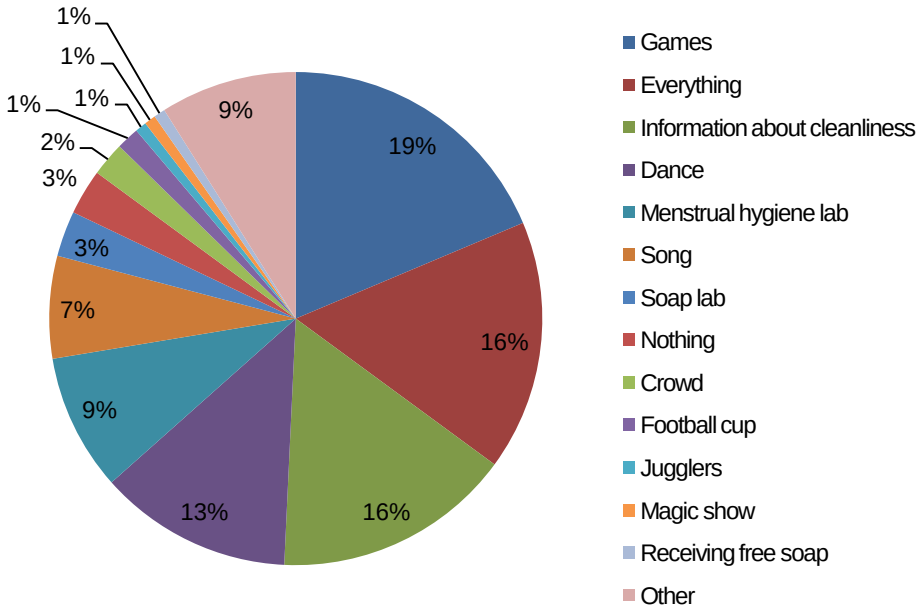


*Figure 6.* Promotion activities that visitors liked best.

Yatra visitors were asked whether they had received any new information on handwashing or open defecation at TGWY. The majority said they did not receive any new information (16%). Thirteen per cent said it was new to them that they should not practice open defecation. Thirteen per cent did not know whether they had got any new information. Nine per cent said to keep clean was new information to them, while 8% said it was new to them that they should both wash hands and use a toilet (see Figure 7).

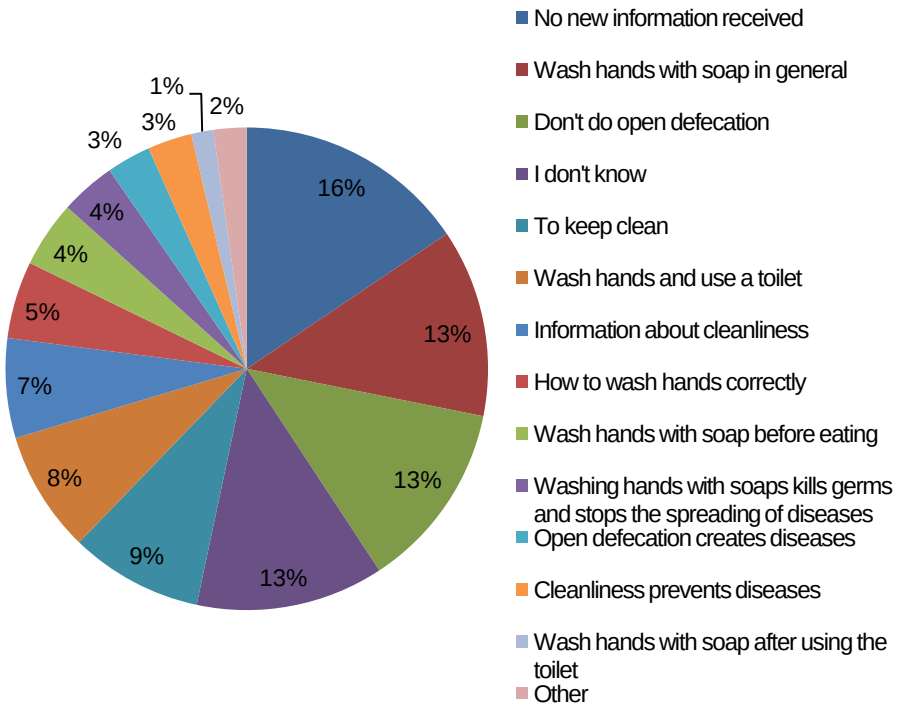


*Figure 7.* New information received at TGWY.

# Conclusion

## Differences Between Baseline and Follow-Up

At baseline, the frequencies of washing hands with soap before preparing food, eating, feeding a child, breastfeeding, and handling drinking water revealed that food related handwashing was not a behaviour that respondents reported performing constantly. On the other hand, stool related handwashing with soap was already found to be frequent. Indeed, significant increases between baseline and follow-up were found only for food related handwashing with soap and not for stool related handwashing. These findings may have been due to a ceiling effect in the reported frequencies of stool related handwashing at baseline, leaving no possibility for increases. The reported frequencies of food related handwashing behaviour showed a greater potential for improvement and constituted behaviour that should be addressed by behaviour change interventions. Since there were no significant differences in the increase of self-reported handwashing behaviour between visitors and non-visitors from baseline to follow-up, no conclusions as to how the different promotion activities influenced handwashing behaviour can be drawn.

Increases in the majority of the behavioural factor items were observed at follow-up. Visitors to TGWY showed a higher increase in the subjective perception of the risk of contracting diarrhoea as well as factual knowledge about the causes of the disease. They also reported feeling more guilty if they did not wash their hands with soap before handling food and being more committed to doing this. The magnitudes of these differences in increases between visitors and non-visitors in the four out of 60 items are considered to be small.

The reasons for the significant increase from baseline to follow-up across all respondents in the self-reported frequencies of food related handwashing practices and in the majority of the item ratings assessing the behavioural determinants are inconclusive. More detailed analyses showed that the 149 respondents who were only interviewed at follow-up had higher ratings across all items as well. Neither of them had visited TGWY. About a fourth of those respondents indicated that another household member had visited the campaign. Even when excluding this subgroup, the ratings were still as high as the follow-up ratings of those respondents who had already been interviewed at baseline.

## Behavioural Determinants Influencing Handwashing at Key Times

Principal component analyses clearly revealed two distinguishable key times for handwashing with soap, namely handwashing before handling food and handwashing after contact with stools.

Food related handwashing with soap is positively impacted by attractiveness as part of the attitude factors and by several normative factors, namely the descriptive and personal norm. Interventions to change food related washing hands with soap should emphasise the feeling of attractiveness after washing hands with soap. The descriptive norm of family and community members can be influenced by highlighting desired behaviours. The importance of personal norms can be emphasised by encouraging individuals to imagine how they would feel after they behaved in a way that is not consistent with their own standards.

Attitude factors, namely nurture and disgust, normative factors, namely other family members’ handwashing behaviour, response efficacy, and personal commitment seem to be very influential regarding faeces related washing hands with soap. Campaign promotion activities should specifically address that other family members often wash their hands with soap after contact with stools. They should emphasise that not washing hands with soap poses a risk to the health of children and that washing hands with soap after defecation is important to set a good example to the children. Likewise, it is important for campaigns to ensure that the target group is convinced that washing hands with soap after contact with stools prevents diarrhoea, thus affecting response efficacy as part of the ability factors. Lastly, it is crucial to increase personal commitment to washing hands with soap after contact with stools in order to positively influence handwashing behaviour.

Considering the major delays in the project launch and short-term changes in the selection of the carnival sites due to the high-level involvement of the Government of India, the results of the baseline survey could not serve as a basis for designing promotion activities. WASH United did not know about the clearly distinguishable key times for handwashing and the different determinants influencing the behaviour until after the campaign. The present results emphasise the importance of planning enough time between baseline and campaign design in order to meaningfully incorporate important findings into the development of the interventions.

## Respondents’ Reactions and Attendance Rates to TGWY

Overall, Yatra visitors liked the activities at TGWY. However, the majority of attendees did not play any games. Most caregivers said that games were targeted at children or that they were not interested in playing any games. Nonetheless, games were mentioned by most of the visitors as their favourite aspect of the carnival. These findings suggest that women might have an interest in participating in activities, but did not feel that they were being addressed directly. Indeed, a larger crowd than ex-

pected came to visit the Yatra, especially children. This resulted in long queues of children in front of the games, deterring adults from actively participating in the activities. Separate activities for children and adults and even different activities focusing on men and women and boys and girls would be a good way to encourage all the different audiences to actively participate.

Most of the survey respondents had heard about TGWY during the Eawag baseline survey. Advertising activities of TGWY campaign played only a minor role in creating awareness about the event itself. Considering the overall huge attendance rates at TGWY, these results are most probably related to the specific target group of the evaluation survey, which mostly consisted of young mothers. Moreover, the baseline survey was carried out before WASH United’s pre-promotion activities, resulting in a somewhat different selection of villages. The low attendance rate at TGWY of the caregivers from the present evaluation study reflects the social position and role of young women in rural areas of northern India. Many wives, especially young mothers, are not allowed to go out of the house, let alone attend a carnival. Consequently, less than 13% of the caregivers interviewed during the baseline survey eventually attended TGWY. Out of the 186 caregivers whose handwashing practices were observed, only 17 went to the carnival site, which is less than 10%. This small number was not enough to conduct any analysis. During baseline, interviewers did hand out flyers with the logo of the campaign and encouraged interviewees to attend TGWY. However, they were not able to share many details of the different elements of the campaign, which made it difficult to motivate and convince the caregivers to visit the carnival. Additionally, at the time of the baseline data collection, some of the opening dates of TGWY had not yet been determined and others were changed retrospectively.

## Target Group of the Survey

The target audience of the Eawag evaluation survey were primary caregivers of children under the age of five, which was not a particular target group of TGWY campaign. Mothers and caregivers of young children were not specifically addressed by the present campaign and were indeed found to make up only a small proportion of the Yatra visitors. Nevertheless, children under the age of five are most vulnerable to morbidity and mortality from diarrhoea. Since mothers are the ones responsible for taking care of children and their sanitation needs, the target group of the present evaluation study at community level were the primary caregivers of children in this age group. The objective of the Eawag evaluation study was to assess and detect behaviour change. The goals and objectives of TGWY were to promote hand-washing behaviour among children and adolescents and to raise awareness about the importance of sanitation and hygiene. Future campaigns aiming for long-term behaviour change in handwashing practices should ensure that women play an active role in the project and the best way might be by promoting improvements at household level. Women are the household food preparers and in most cases the primary caregivers of children, so it is essential that women themselves pay attention to basic hygiene habits such as handwashing after defecation and before handling food. These women routinely teach and encourage good hygiene practices in the family. They pass on habits and behaviour to their children and should thus be one of the main target groups concerning behaviour change of daily personal and domestic hygiene. If a campaign wants to target specific habits, promotion activities need to focus on existing practices. The survey instrument, including the behavioural determinant items used in the present study, is one method of gathering information about sanitation behaviour and attitudes. Patterns of behaviour, the motivations behind behaviour, and information on women in the project area should be included in the data and used in the planning of future promotion activities.

# Evaluation of the WASH in Schools Training Sessions

## Methods

**Design.** In order to evaluate the “WASH in schools training sessions” (WinS), data was collected in a longitudinal survey. A questionnaire was specifically developed to assess the handwashing behaviour of school children and the underlying behavioural determinants. Two to six items were used to quantify each psychological determinant. The aim was to investigate potential changes in handwashing behaviour with soap and the psychological determinants underlying this behaviour change. Fifteen schools in thirteen locations were investigated before and after the WinS. To assess the impact of the WinS, surveys were conducted in 10 schools where WinS took place. Five schools served as controls. Both at baseline and at follow-up, school children filled out surveys on handwashing practices and observations of handwashing facilities were conducted.

**Survey Procedures.** The observations and interviews of the baseline survey were carried out between the 28 August and 22 September, 2012. The follow-up evaluation was executed between the 8 November and 4 December, 2012, about a month after the training sessions. Fourteen public schools and one private school were investigated. Surveys took place at stops two, three, and four of the six stations of TGWY. Three schools were located in Gwalior (Madhya Pradesh), seven schools in Indore (Madhya Pradesh), and five schools in Kota (Rajasthan). Middle school children from $6^{th}$, $7^{th}$, and $8^{th}$ grade participated in the survey. Questionnaires in Hindi were handed out to the school children during class. An interviewer read each question out loud. Children were allowed to ask questions, and the interviewers individually helped the children to fill out the questionnaire. This proved to be very helpful, because some children had difficulties in reading and understanding the questionnaire.

**Sample Size.** A total of 1006 children took part in the survey at the baseline stage. In the early phase of data collection, primary school children ($1^{st}$ to $5^{th}$ grade) also filled out the survey questionnaire. Since the questionnaire proved not to be working very well with primary school children in rural Indian villages, 230 cases were excluded before data entry, leaving only the surveys filled out by middle school children. An additional two cases were excluded because of insufficient reading skills. After these adjustments, 774 questionnaires from 10 WinS and five control schools were deemed suitable for analyses. Due to the learning from the baseline investigation, no data of the follow-up evaluation needed to be excluded. Six hundred and five children of the same middle school classes filled out the survey. Four hundred and sixty-six children (77%) were from schools where WinS took place. During baseline and follow-up, a total of 1379 suitable questionnaires were gathered.

**Statistical Analyses.** Chi-square and Mann–Whitney tests were used to determine the differences between WinS schools and control schools at both baseline and follow-up. For the comparisons, the alpha level was set at .05. *P* values were adjusted by Bonferroni correction since a large number of comparisons were carried out ($p < .001$). Relative proportions of responses are indicated as percentages and were calculated for valid cases only. Missing responses will not be mentioned for every item. Two-tailed statistics were used. All statistical analyses were performed using IBM SPSS Statistics 20.

# Findings

## General Characteristics of the Sample

Children who participated in the baseline survey were on average 12 years of age (*SD* = 1.46). Ages ranged between 9 and 19. Out of the 774 students, 30% were male and 42% were female; the remaining students did not report their gender. At follow-up, children of an average age of 12 years (*SD* = 1.49) filled out the questionnaires. Ages ranged between 8 and 18. The sample consisted of 42% males and 50% females; the remaining children did not report their gender.

## Self-reported Use of Handwashing Agents

At follow-up, students were asked about the agent they usually used for handwashing: “What do you usually use when you wash your hands? “ The majority of the students reported that they usually wash their hands with soap and water (92%). Only 4% of children reported washing their hands with water only. Two per cent reported using ash and water. “Only sand” and “only ash” was mentioned by 1% respectively.

## WASH in Schools Training Sessions: Related Attitudes and Responses

Children from the schools where WinS training sessions took place where asked if they had liked the training, and 86% of the children reported they had liked it very much. Only 7% showed less preference for the training by responding with “somewhat” and 3% did not like it at all. When asked which component of the training they liked best, 41% showed a preference for the handwashing challenge. Less than a third (31%) liked the tippy tap competition best and 23% favoured the world toilet cup.

To gain an overall picture of the learning from the training sessions, students were asked to recall the three messages of the training in an open question. A total of 71% of the children recalled that they should not practice open defecation. Forty-one per cent of the children recalled they should wash their hands both before eating and after using the toilet. The responses are listed in descending order in Table 2.

Table 2

*Recalled Messages and Percentage of Children Mentioning the Message*

| | % |
|---|---|
| Don't practice open defecation | 71 |
| Wash hands with soap | 52 |
| Wash hands before eating | 41 |
| Wash hands after using the toilet | 41 |
| Wash hands (in general, soap not mentioned) | 22 |
| Cleanliness / keep yourself/surroundings clean | 10 |
| Pass on the messages of the training sessions | 10 |
| Drink clean water / cover food | 7 |
| Invalid response | 5 |
| Use ash if there is no soap for handwashing | 2 |

*Note*. Data expressed as a percentage of all cases (Total = 261%).

When asked whether they passed on the message about handwashing, 91% of students agreed, 3% disagreed, and 2% could not remember. When asked whether they told their parents about the training, 91% affirmed, 5% responded negatively, and 1% could not remember.

## Knowledge About Handwashing with Soap and Toilet Use

During the follow-up, students were asked why it is important to use soap when washing hands. In the schools where WinS trainings took place, a large proportion of the sample (62%) responded correctly by stating: “Soap destroys germs / keeps you healthy” (see Figure 8). Three per cent thought that soap “keeps you clean”. However, 24% of the answers were categorised as invalid. In the control schools, 71% knew that soap destroys germs or keeps healthy, 4% only mentioned that soap keeps clean. Seventeen per cent gave invalid responses. Comparisons of responses between WinS and control schools yielded no significant differences ($p$ = .091).

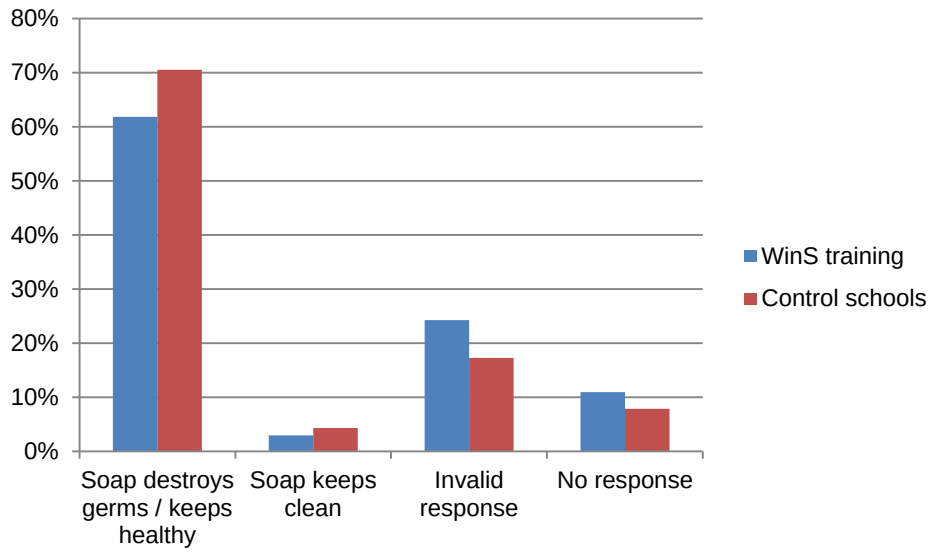


*Figure 8*. Knowledge on the importance of soap use.

When asked why it is important to use a toilet, children from WinS schools most often gave invalid answers (29%) (see Figure 9). Twenty-eight per cent reported that it was important because germs don’t spread or it keeps you healthy, which was rated to be the correct answer. “To keep the environment clean” was mentioned by 20%. Of the children from control schools, 39% gave invalid answers. Thirty-three per cent said it is important to use a toilet to prevent the spread of diseases and 14% mentioned a toilet should be used to keep the environment clean. No significant differences were found between the WinS and control schools ($p$ = .532).

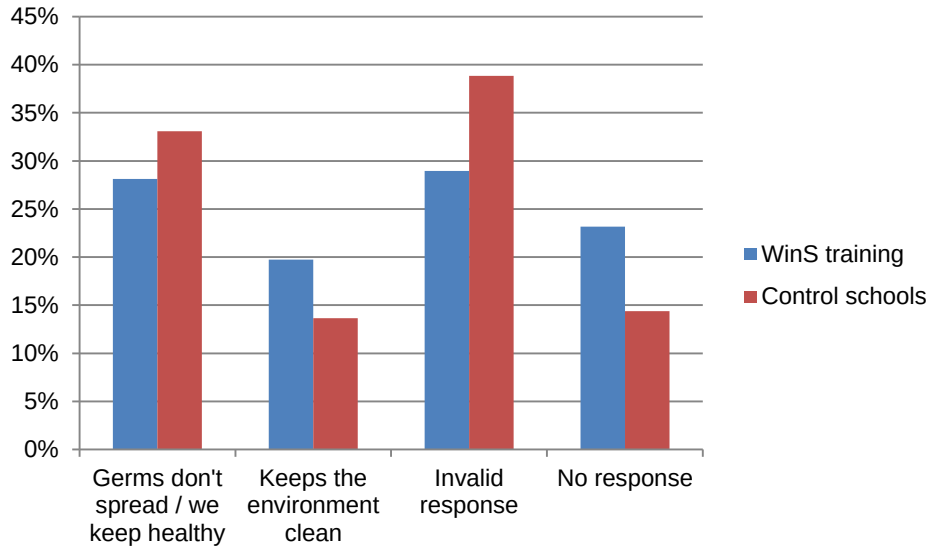


*Figure 9*. Knowledge about the importance of toilet use.

## Effects of the WASH in Schools Training Sessions on Self-Reported Handwashing Behaviour

At baseline, 99% of the children from WinS schools and 98% of the children from control schools reported washing their hands with soap after using the toilet when they are at school. Likewise, 99% of the children from WinS schools said they wash their hands with soap before eating when they are at school. Ninety-three per cent of the children from control schools said they use soap for handwashing before eating. This difference proved to be significant. Ninety-seven per cent of the children from WinS schools reported having washed their hands at school with soap during the last 24 hours, so did 91% of the children from the control schools.

At follow-up, there were heavy declines in the reported frequencies of handwashing in control schools (see Table C1 in Appendix C for details). Only 46% of the children reported washing hands with soap after using the toilet, 51% said they wash their hands at school with soap and water before eating, and only 42% of the children mentioned having used soap at school the day before the survey. In the WinS schools, the reported frequencies for washing hands with soap after using the toilet and before eating decreased only slightly from baseline to follow-up. However, these differences also proved to be significant. No differences were found in the WinS schools for reported handwashing rates in the last 24 hours. At first glance, there does not seem to be a logical explanation for the drop in the reported frequencies of handwashing behaviour in the control schools. Considering the lack of soap and proper handwashing stations in the schools, the reported rates at follow-up seem closer to reality. It could be that children from the control schools were more honest at follow-up, because in between the two survey periods, the importance of using soap for handwashing was not emphasised to the extend it was in the WinS schools.

## Effects of the WASH in Schools Training Sessions on Behavioural Determinants

At baseline, the WinS schools did not differ from the control schools in any of the items assessing behavioural determinants (see Table C2 in Appendix C). At follow-up, significant differences were found for two items only. In control schools, fewer children reported that they wash their hands with soap after using the toilet and they also reported that fewer teachers think they should wash their hands with soap after using the toilet. When comparing baseline and follow-up rates in WinS schools, neither increases nor decreases were found for either of the items.

## Observation of School Facilities

### *WinS schools*

**Availability of water.** In almost all schools, there was a functioning hand pump on the school premises at both baseline and follow-up (see Appendix D for details). There was one school where children had to leave the school grounds to reach the nearest hand pump and in one of the schools, the hand pump was broken at follow-up, making it impossible for the children to wash their hands. There were means of washing hands inside the toilet building in only one school. However, no soap was observed. In one of the 10 schools where training sessions took place, a tippy tap was found at follow-

up. However, there was no water in the jerry can and no soap was attached to it. It also did not appear to be in use.

**Availability of soap.** In some of the schools, soap was present on the day of the observation. However, when the interviewers asked several children, it turned out that soap was made available before lunch in only five of the ten schools. As reported by the children, soap was not available in any of the schools on a regular basis. Soap was found next to the water tap at follow-up in only one of the schools.

**Open defecation.** In three of the schools, it was obvious that children practiced open defecation. In a fourth school, it was assumed, since the toilet facilities appeared unused. Reasons for open defecation were either locked toilets or unusable, dirty toilets.

***Control schools***

**Availability of water.** In all five schools, water was available at baseline and at follow-up. In one of the schools, a water tank was present, in another one a tube well. Hand pumps were observed in the remaining three schools.

**Availability of soap.** No soap was observed in any of the control schools. Children of four out of five schools said they were told to wash their hands with soap before having lunch. Apparently, in one of the schools soap is never available.

**Open defecation.** In two out of the five schools, it was obvious that children practiced open defecation. In one of the schools, new toilet facilities had been built after the baseline observation. However, they did not seem to be in use at follow-up. In the only private school that was surveyed, toilet facilities were entirely lacking.

# General Observations

## Sample Size

Since the surveyed schools were smaller than presumed, the number of students per school was substantially lower than expected. Furthermore, in many schools a considerable proportion of the students did not attend class on a daily basis. Follow-up took place around the Diwali festival, which explains the lower number of children at follow-up. Additionally, 230 primary school children who had filled out the questionnaire at baseline were not surveyed at follow-up.

## Survey Procedure

Prior to beginning the survey, approval had to be obtained from the schools’ principals. The procedures of the survey were briefly explained and it was emphasised that the survey results would remain confidential and anonymous. To exemplify the nature of the survey to each of the school principals, an inspection copy was handed out. Initially, observations and surveys were carried out one day later at an arranged time. However, this approach proved to influence the survey, because teachers tended to positively influence children’s responses and handwashing behaviour. Thus, to avoid biased behavioural responses, surveys were then conducted immediately after receiving permission.

### Observations on Children’s Handwashing Behaviour

Structured observations on children’s handwashing practices in village schools proved to be difficult, even impossible. The frequent occurrence of broken handwashing facilities, handwashing facilities outside the school premises, or the practice of open defecation in the fields made consistent observations of handwashing practices after using the toilet impossible. Field experience showed that during the observation period children either washed or were told to wash their hands and use soap to impress the observers, or they did not use any facilities at all out of shyness or embarrassment. Conducting the observation prior to informing the school about the nature of the survey was not feasible, because the school principals’ permission to conduct the survey had to be obtained first. Moreover, the appearance of the research team in village schools never passed unnoticed and inevitably created reactivity in the children’s behaviour.

Considering the limitations of school hours, the time pressure under which the baseline survey was carried out, practical limitations on project team time, and the important issue of reactivity, structured observations on children’s handwashing practices did not provide sufficient opportunities for observation. Given the difficulties associated with observing school children’s handwashing activities after using the toilet, and the concerns about the amount and type of data that could effectively be observed and recorded, data were not collected on these activities. Instead, a school facility survey using proxy measures for handwashing was completed. The checklist included structured observations of facilities such as the presence of soap and water for handwashing, and the cleanliness and functionality of the latrines. To obtain adequate results from the observations of school children’s handwashing behaviour and to minimise reactivity, structured observations on a long-term basis would be necessary. However, the implementation of such time consuming data recording needs elaborate preparation and would be a challenging and expensive research project on its own.

## Conclusion

### Knowledge About Handwashing with Soap and Toilet Use

A month after the campaign, over two thirds of the children from WinS schools recalled the first message of the WinS training session, that they should use a toilet when available. Slightly less than half of these children recalled they should always wash their hands with soap after using the toilet and before eating. Ten per cent of the children remembered to pass on the messages. However, in both, WinS and control schools, the majority of the children were well aware of the fact that they should not practice open defecation. In order to help them do this, the necessary facilities need to be provided by the schools. Likewise, more than half of all the surveyed children knew about the importance of using soap, namely because soap destroys germs and the use of soap preserves health. But again, children are not able to use soap after using the toilet, if the school does not provide soap.

### Reported Handwashing Behaviour and Behavioural Determinants

Considering the conditions of the toilet facilities and the lack of soap in the surveyed schools, the self-reported frequencies of handwashing with soap certainly do not coincide with actual handwashing

behaviour. The self-reported handwashing behaviour rather is an indication for social desirability. It does, however, reflect an existing awareness of the importance of using soap for washing hands. The reasons for the drastic drop from baseline to follow-up in the frequencies of self-reported use of soap while washing hands in the control group remain unclear. No changes in infrastructure were observed in any of the control schools.

Much more than half of the children stated it is easy to always wash their hands with soap after using the toilet. However, in the majority of the schools, soap was only available before lunch. It can be assumed that soap is not constantly available for handwashing after using the toilet in any of the surveyed schools. Since the children’s answers are not related to the actual state of school facilities, their responses were somehow influenced. Although attempts were made to avoid teachers influencing children’s responses, it is possible that they tried to have the children portray their school in a good light. Likewise, the answers may be distorted as a result of the students’ desire to appear socially acceptable, especially since the subject matter of the survey touches on a sensitive topic.

## Observations of School Facilities

The observations of school facilities did not reveal any noteworthy improvements in infrastructure or cleanliness from baseline to follow-up. In the WinS schools, only one tippy tap without water or soap was observed and soap was available outside of lunch hours in only one school. The current findings raise the question of whether a single day of training is sufficient to effectively influence and change daily habits in the longer term. In particular, if infrastructures do not provide means to perform a new behaviour, then behaviour change interventions cannot result in the desired outcome.

# On-Site Evaluation of “The Great WASH Yatra”

## Methods

**Design.** The concurrent on-site evaluation of the campaign was implemented as a non-experimental panel survey. The same visitors were interviewed before and after their visit to TGWY carnival.

**Survey procedures.** Data were collected over a five-week period, from October 14 through November 19, 2012 from five stations of TGWY by means of structured interviews. The stations were Indore, Kota, Gwalior, Gorakhpur, and Bettiah, all districts in India. Data were collected before and after the interviewee’s visit to the carnival site. Selection criteria were that respondents were aged 18 years or more, that they intended to visit TGWY immediately after the first interview (pre-interview), and that they were committed to giving a second interview (post-interview) after their visit to the carnival grounds. Interviews lasted between 10 and 15 minutes each. The interviewers were instructed to recruit participants from both genders equally if possible. Each respondent who participated in both the pre- and the post-interview received three bars of soap as an incentive.

**Sample size.** In total, 1544 interviews were conducted, 843 pre-interviews and 701 post-interviews. Due to some respondents’ refusal to participate in a post-interview, a total sample of 693 matching pre- and post-interviews were conducted. It is important to note that a different version of pre- and post-interviews was used at the first station in Indore. Because of insufficient variance in the items concerning the popularity of the activities, certain items were added, and others were slightly modified. The new version of pre-and post-interviews was used at the four remaining stations in Kota, Gwalior, Gorakhpur, and Bettiah.

**Statistical analyses.** McNemar and Wilcoxon tests were used to determine differences in the behavioural determinants between the pre- and post-interviews. For the comparisons, the alpha level was set at .05. *P* values were adjusted by Bonferroni correction since a large number of comparisons were carried out ($p < .003$). Relative proportions of responses are indicated as percentages. Two-tailed statistics were used. All statistical analyses were performed using IBM SPSS Statistics 20.

## Findings

### General Characteristics of the Sample

The sample consisted of 61% male and 39% female respondents. The age of the respondents ranged between 18 to 84 years, with a median age of 30 years (*SD* = 14.9). The mean number of years of education was 6 (*SD* = 3.6), and the mean monthly household income was 3’500 INR which was about 65 CHF at that time (*SD* = 10’593). The majority of the respondents were Hindu (87%), 12% were Muslim. Seventy-three per cent of the respondents were able to read and write and 21% could neither read nor write. Seventy-six per cent of the respondents were married and 22% were single.

## Activities of and Knowledge Gained at TGWY

Interviewed visitors were asked how much time they spent at TGWY. The mean number of minutes was 60 (*SD* = 73). In addition, interview start and end times were noted by the interviewers. This was to calculate how much time the respondents really spent at the carnival. The mean number of recorded minutes was 41 (*SD* = 50).

About 50% of respondents liked TGWY very much and 98% would recommend visiting TGWY to their family or friends. About half of the respondents had heard about TGWY through word of mouth, 16% had read about the event in a newspaper, and 13% indicated having heard about TGWY through the local municipality (see Figure 10. Sources of awareness about TGWY among interviewed visitors.).

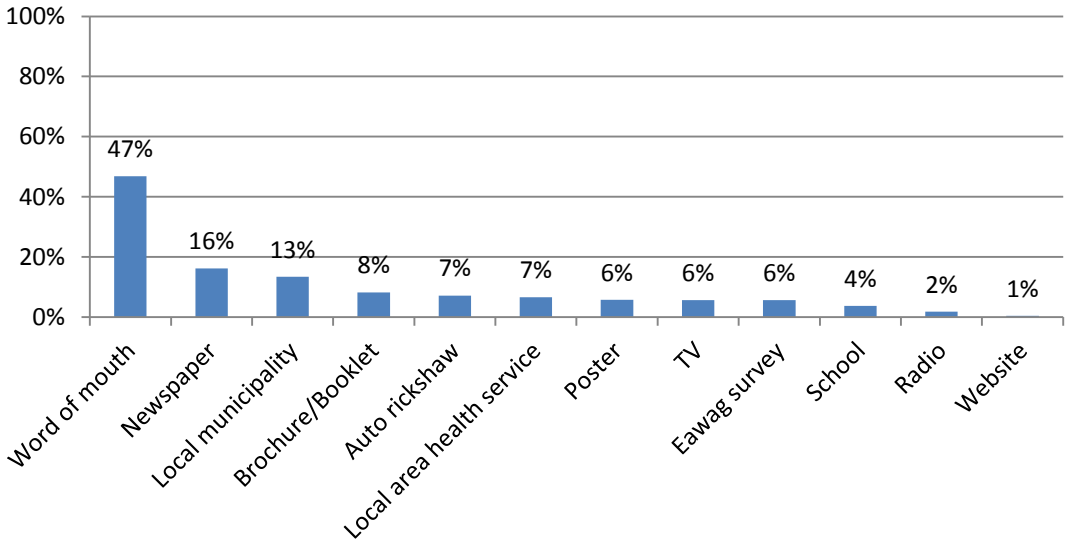


*Figure 10.* Sources of awareness about TGWY among interviewed visitors.

The 553 respondents, who were questioned with the second version of the post-interview, were asked which activities they liked best. Table 3 shows a list of the promotion activities respondents liked best. At the top of the list is the soap lab, the film about hygiene ranks second, and the menstrual hygiene lab takes third place.

Table 3

*Ranking List of Preferred Activities*

| Promotion activity | % of all responses |
|---|---|
| Soap lab | 13 |
| Film about hygiene | 8 |
| Menstrual hygiene lab | 6 |
| Velcro poo in the loo | 6 |
| Clean hands challenge | 5 |
| Poo hoops | 5 |
| Ludo | 5 |
| Other games and activities | 1-4% each |

The majority of the respondents (58%) did not play any games. As shown in Figure 11, the main reasons for this were that “there were too many people or the queue was too long” (35%) and because they think that “games are only for children” (28%).

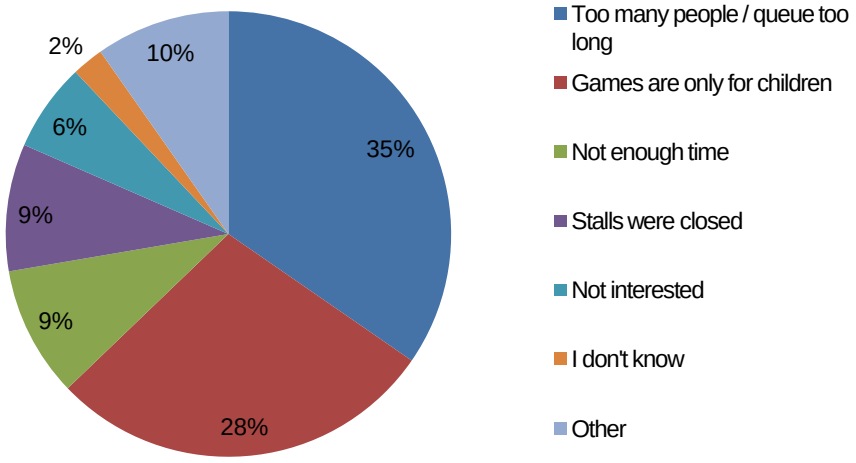


*Figure 11*. Reasons why respondents did not play any games.

Respondents were asked what information they got from the three activities they liked best. Thirty-seven per cent of respondents said they did not receive any information. Figure 12 summarises the answers. The majority of the information respondents received was related to the topics “handwashing

with soap”, e.g. “always wash hands with soap after toilet”, and “stop open defecation”, e.g. “do not defecate in the open/use toilet”.

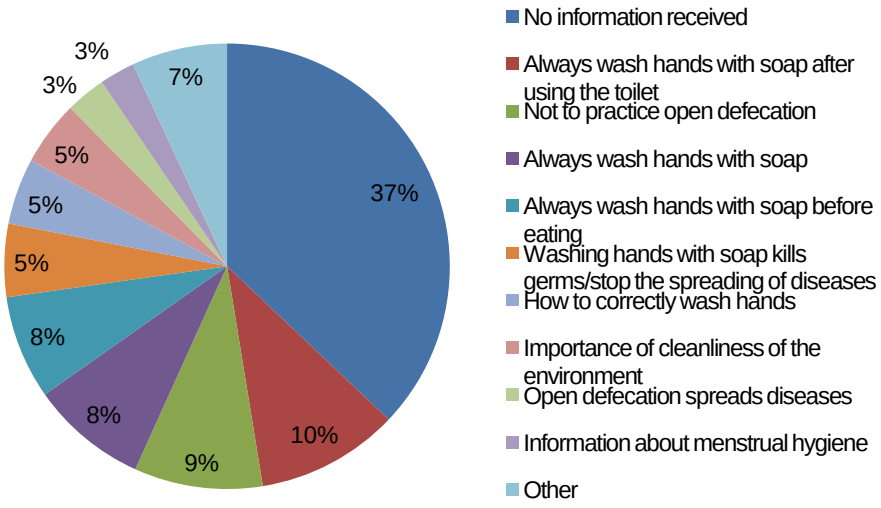


*Figure 12.* Information respondents got at the activities they liked best.

Figure 13 displays the games respondents played. The figure shows that the majority of the respondents neither played nor had a look at the games and that the overall participation rate in any kind of game was low. Velcro poo in the loo was the game most often played by the respondents (14%). At the other end of the scale are the world toilet cup cricket and the musical toilets with a reach of only 1%.

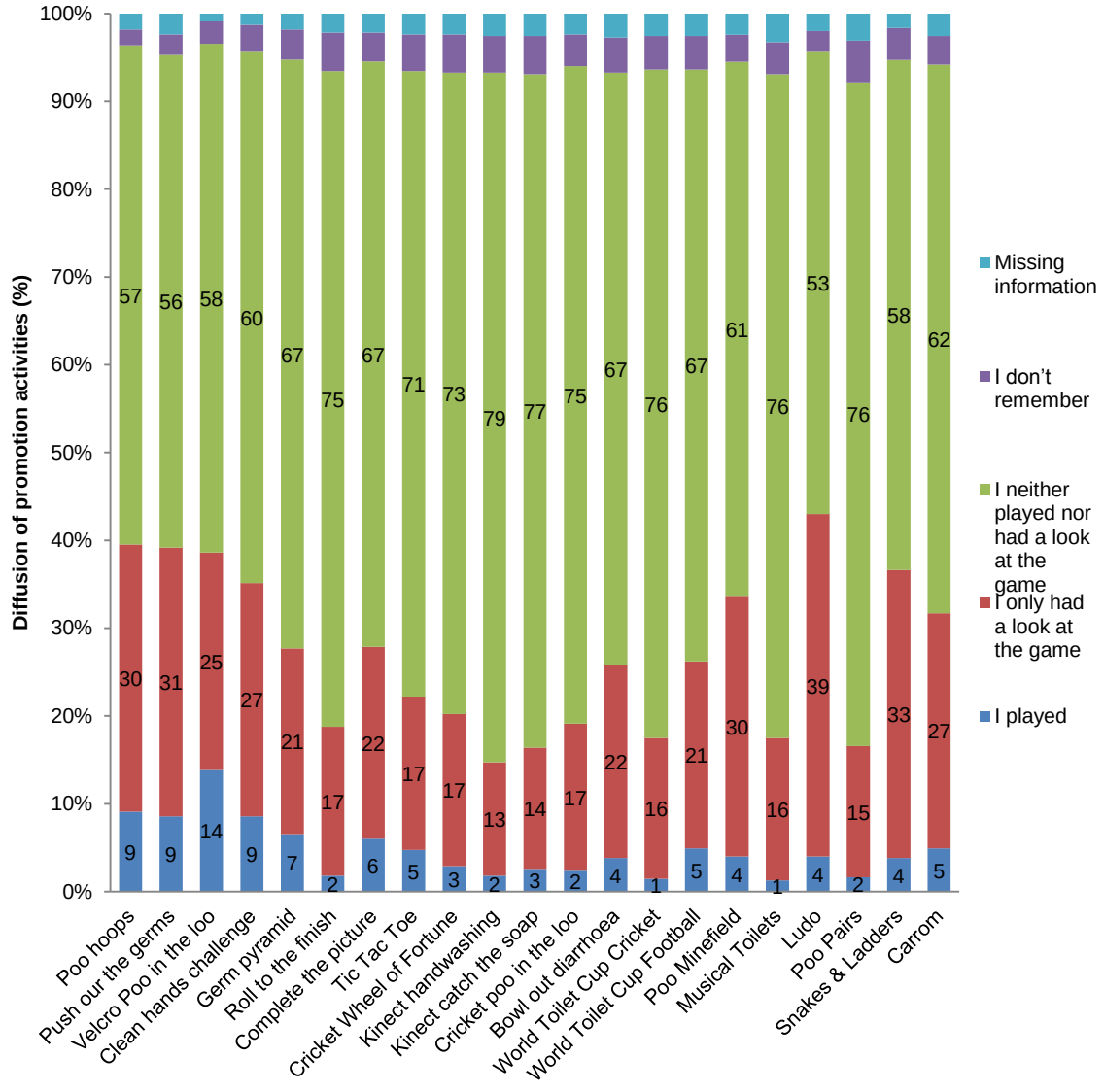


*Figure 13*. Different games respondents played.

Figure 14 displays the reach of the different labs. The lab with the highest participation was the soap lab with a reach of 28% of all respondents.

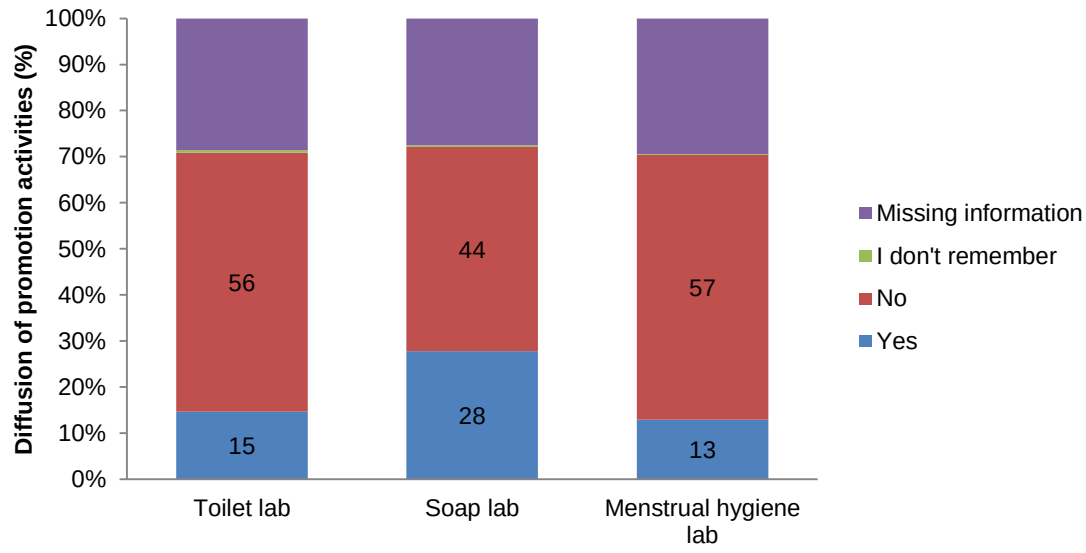


*Figure 14*. Different labs respondents participated in.

Figure 15 shows the reach of the activities that visitors could follow on stage, but not participate in. The activity with the highest reach was the film about hygiene with 16%.

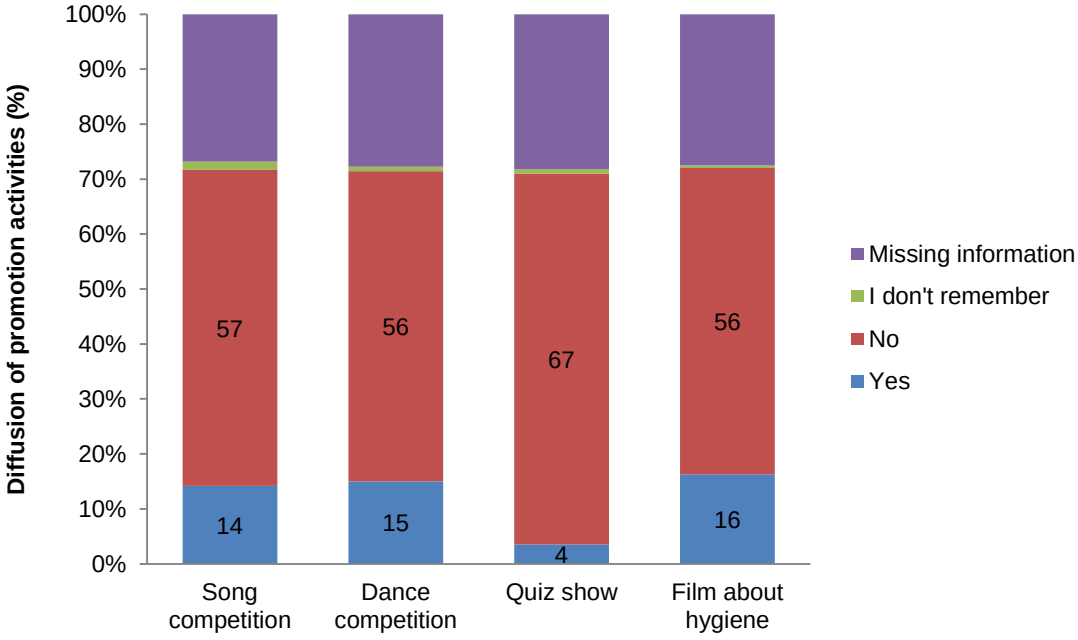


*Figure 15*. Different activities on stage that respondents watched.

After their visit to TGWY, respondents were asked if they had got any new information on handwashing or open defecation at the carnival. Figure 16 shows that the majority of respondents (48%) did not

receive any information that was new to them. Added up, 13% of the respondents got new information regarding handwashing with soap.

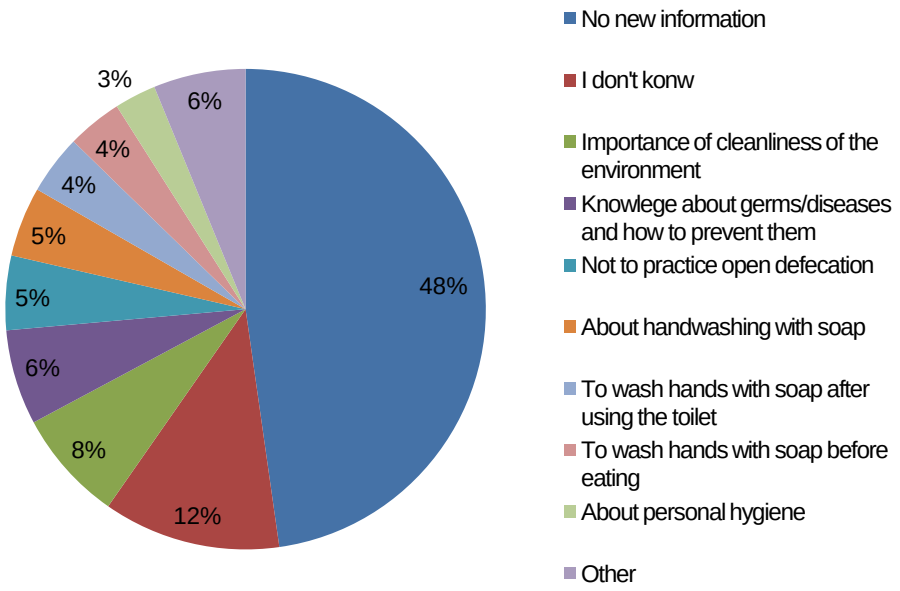


*Figure 16*. New information on handwashing or open defecation respondents received at TGWY. Data expressed as a percentage of all respondents (*N* = 553).

The interviewees who mentioned having received new information at TGWY were asked if they were going to make any changes in their everyday life because of this new information. As shown in Figure 17, 26% of the respondents answered that they will share the new information with their family or others and 17% answered that they will wash their hands with soap in future.

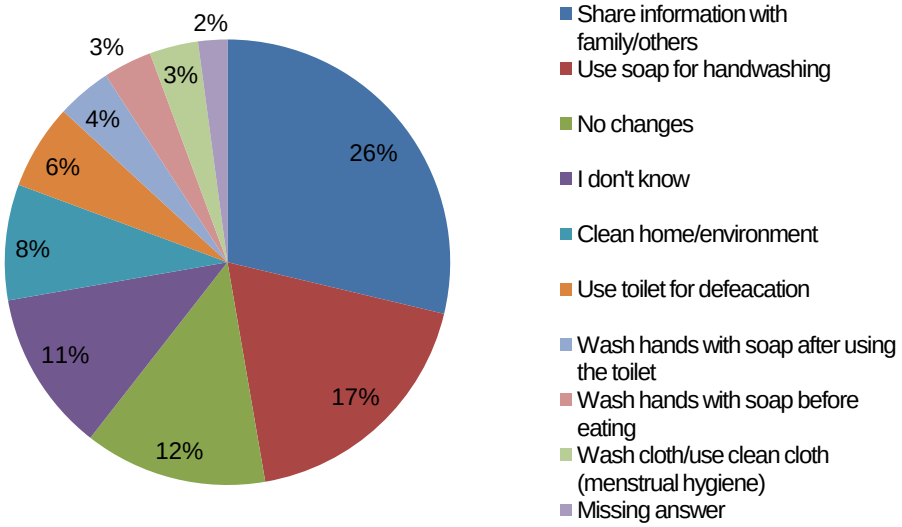


*Figure 17.* Changes respondents said they were going to make in their everyday life because of the new information they received at TGWY. Data expressed as a percentage of all respondents (*N* = 210).

## Effects of TGWY Campaign on Behavioural Determinants

The different behavioural determinants were assessed before and after the respondents’ visit to TGWY. The results show that TGWY elicited statistically significant changes in several behavioural determinants (see Table 4). After visiting TGWY, respondents reported a reduced risk of getting diarrhoea; on the other hand, they rated the possible impact of the disease on their life as more severe. During the post-interview, respondents gave significantly more correct answers as to what are the causes of diarrhoea and how the disease can be prevented. They reported liking handwashing better and feeling dirtier if they did not wash hands with soap after using the toilet. The respondents also felt that what people who are important to them think they should do regarding handwashing with soap was more salient after the visit. Likewise, the personal obligation to wash hands with soap increased. Respondents also reported it to be less difficult to find the time to wash hands with soap after using the toilet and gave more useful alternatives as to what to do when no soap is available for handwashing. Remembering to wash hands with soap after using the toilet in the sense of forming an intention also increased from pre- to post-interview. This difference between pre- and post-interview was small as were most differences in the behavioural determinants. Noteworthy are the increases in perceived severity, health knowledge, injunctive norm, and coping planning.

Table 4

*Means and Standard Deviations of the Behavioural Determinants Between Pre- and Post-Interviews*

| Behavioural factors | Pre-interview | Post-interview |
|---|---|---|
| | *M* (*SD*) | *M* (*SD*) |
| **Risk factors** | | |
| Perceived vulnerability (1-5) | **2.58 (1.39)** | **2.32 (1.26)** |
| Perceived severity (1-5) | **3.28 (1.45)** | **3.56 (1.12)** |
| Health knowledge (% of correct answers) | **73%** | **82%** |
| **Attitude factors** | | |
| Instrumental beliefs (1-5) | 4.27 (0.55) | 4.33 (0.44) |
| Affective beliefs (1-5) | **4.26 (0.73)** | **4.54 (0.46)** |
| **Norm factors** | | |
| Injunctive norm (1-9) | **8.05 (1.64)** | **8.56 (0.72)** |
| Personal norm (1-5) | **3.99 (0.91)** | **4.19 (0.70)** |
| **Ability factors** | | |
| Self-efficacy (1-5) | 3.97 (1.71) | 4.02 (0.66) |
| Perceived behavioural control (1-5) | **4.79 (0.53)** | **4.95 (0.28)** |
| Maintenance self-efficacy (1-5) | 3.85 (0.93) | 3.92 (0.64) |
| Recovery self-efficacy (1-5) | 3.86 (0.92) | 4.00 (0.60) |
| **Self-regulation factors** | | |
| Action control (1-5) | 3.78 (1.03) | 3.93 (0.69) |
| Coping planning (% of useful alternatives) | **69%** | **84%** |
| Remembering (1-5) | **3.94 (0.89)** | **4.16 (0.61)** |
| Commitment (1-5) | 4.06 (0.92) | 4.13 (0.56) |

*Note*. Values in bold indicate a significant difference between pre- and post-interviews at a level of $p < .003$, after Bonferroni adjustment for multiple comparisons.

# Conclusion

## Preferred Promotion Activities

As far as liking TGWY goes, people definitely enjoyed the carnival and almost everyone would recommend visiting TGWY to friends and family members. The soap lab and the film about hygiene were the preferred activities. In the soap lab, participants experienced how their health can be affected if they do not wash their hands with soap. Through ultra-violet light they were able to see the effectiveness of handwashing with soap to remove germs. The film about hygiene was played on a big screen at the centre of the stage which caught the attention of the visitors. The song from the film was very entertaining and innovative and its message was easy to follow.

## Resonance of the Promotion Activities

The strong resonance of TGWY led to many more visitors than expected by the organisers and resulted in long queues at the different stalls. As a consequence, most respondents spent on average less than 45 minutes at the campaign site and over half of the interviewed visitors did not actively participate in any kind of activity. It is noteworthy that the Eawag on-site evaluation focused on interviewing adults. The participation rates are certainly biased by the fact that most of the activities were designed for children and primarily attended by children. Of those respondents who watched or actively participated in some activities, over a third indicated that they had not received any information at the activities. Additionally, the majority reported not having received any new information on handwashing or open defecation at the carnival as a whole. It could be that most visitors were already aware about the benefits of handwashing with soap and not practicing open defecation. On the other hand, it is possible that they were too embarrassed to admit that this kind of information was new to them. The fact that many visitors did not get messages about hygiene and sanitation at the activities might be a result of the large crowds in front of the stalls. Less people per activity could result in more active participation and more effective spreading of the hygiene messages.

## Effects of a Visit to the TGWY on Behavioural Determinants

Many behavioural determinants for handwashing with soap significantly increased from pre- to post-interview. Noteworthy is that after having visited TGWY, respondents rated the possible impact of the disease on their life as more severe. The respondents also gave significantly more correct answers regarding the causes of diarrhoea and how the disease can be prevented. They rated other people’s opinion about handwashing with soap as more salient and gave more useful alternatives as to what to do when soap is not available for handwashing.

# Appendix

## Appendix A: Self-Reported Handwashing Behaviour and Behavioural Determinants (Household Surveys)

Table A1

*Means and Standard Deviations of Self-Reported Frequencies of Handwashing Behaviour for Baseline and Follow-Up in Visitors and Non-Visitors*

| Handwashing behaviour | Baseline | | Follow-up | | Baseline versus follow-up | | Baseline versus follow-up in visitors and non-visitors | |
|---|---|---|---|---|---|---|---|---|
| | Non-visitors | Visitors | Non-visitors | Visitors | | | | |
| | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *p*-value | Partial $\eta^2$ | *p*-value | Partial $\eta^2$ |
| Washing hands before eating | 3.18 (1.54) | 3.18 (1.57) | 3.95 (1.11) | 4.26 (0.81) | **.0000** | .115 | .0622 | .004 |
| Washing hands before breastfeeding | 2.26 (1.58) | 2.31 (1.61) | 2.79 (1.45) | 3.30 (1.41) | **.0000** | .055 | .0326 | .005 |
| Washing hands before feeding a child | 2.86 (1.57) | 3.03 (1.69) | 3.44 (1.31) | 3.99 (0.97) | **.0000** | .075 | .0420 | .004 |
| Washing hands before cooking | 3.17 (1.59) | 3.23 (1.62) | 3.73 (1.19) | 3.99 (1.04) | **.0000** | .057 | .2962 | .001 |
| Washing hands before handling drinking water | 2.43 (1.66) | 2.53 (1.69) | 2.58 (1.36) | 3.04 (1.39) | **.0003** | .013 | .0517 | .004 |
| Washing hands after defecation | 4.35 (1.12) | 4.59 (0.95) | 4.55 (0.79) | 4.54 (0.72) | .2403 | .001 | .0297 | .005 |
| Washing hands after wiping a child's bottom | 4.25 (1.18) | 4.55 (1.04) | 4.48 (0.83) | 4.56 (0.66) | .1126 | .003 | .0269 | .005 |
| Washing hands after other kinds of contacts with faeces | 4.11 (1.20) | 4.30 (1.22) | 4.33 (0.92) | 4.44 (0.74) | .0106 | .007 | .5613 | .000 |

*Note*. Scale ranges = 1-5. *P*-values in bold indicate a significant level of $p < .006$, after Bonferroni adjustment for multiple comparisons.

Table A2

*Means and Standard Deviations of the Behavioural Determinants for Baseline and Follow-Up in Visitors and Non-Visitors*

| Behavioural factors | Baseline | | Follow-up | | Baseline versus follow-up | | Baseline versus follow-up in visitors and non-visitors | |
|---|---|---|---|---|---|---|---|---|
| | Non-visitors | Visitors | Non-visitors | Visitors | | | | |
| | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *p*-value | Partial $\eta^2$ | *p*-value | Partial $\eta^2$ |
| **Risk factors** | | | | | | | | |
| **Perceived vulnerability** | | | | | | | | |
| Risk to get diarrhoea (1-5) | 2.09 (1.18) | 1.91 (1.01) | 2.50 (1.29) | 2.92 (1.35) | **.0000** | .076 | **.0001** | .015 |
| Risk for a child under 5 to get diarrhoea (1-5) | 2.57 (1.29) | 2.48 (1.16) | 2.93 (1.57) | 3.22 (1.51) | **.0000** | .035 | .0469 | .004 |
| **Perceived severity** | | | | | | | | |
| Impact of diarrhoea on the life in general (1-5) | 3.07 (1.25) | 3.24 (1.26) | 3.58 (1.01) | 3.81 (0.88) | **.0000** | .055 | .6776 | .000 |
| Impact of diarrhoea on the social life (1-5) | 2.65 (1.27) | 2.84 (1.30) | 3.72 (1.04) | 3.88 (0.92) | **.0000** | .176 | .8262 | .000 |
| Impact of diarrhoea on the economic situation (1-5) | 3.15 (1.36) | 3.17 (1.42) | 3.82 (1.20) | 4.13 (1.02) | **.0000** | .095 | .0652 | .004 |
| Impact of diarrhoea for a child below 5 (1-5) | 3.62 (1.28) | 3.76 (1.27) | 4.20 (1.00) | 4.36 (0.89) | **.0000** | .062 | .8136 | .000 |
| **Health knowledge** | | | | | | | | |
| Causes of diarrhoea (1-6) | 0.67 (0.89) | 0.86 (1.08) | 0.94 (1.10) | 1.66 (1.36) | **.0000** | .063 | **.0001** | .016 |
| **Attitude factors** | | | | | | | | |
| **Instrumental beliefs** | | | | | | | | |
| *Efforts* | | | | | | | | |
| Washing hands with soap is expensive (1-5) | 2.15 (1.38) | 2.06 (1.27) | 1.92 (1.14) | 1.80 (1.12) | .0009 | .011 | .8441 | .000 |
| Washing hands with soap is time-consuming (1-5) | 1.20 (0.58) | 1.14 (0.43) | 1.33 (0.75) | 1.32 (0.76) | **.0003** | .013 | .6882 | .000 |
| Washing hands with soap takes a lot of effort (1-5) | 1.14 (0.49) | 1.12 (0.38) | 1.31 (0.71) | 1.37 (0.85) | **.0000** | .028 | .2343 | .001 |
| Thinking that handwashing facility is far away (1-5) | 1.51 (0.72) | 1.46 (0.75) | 1.58 (0.76) | 1.56 (0.73) | .0736 | .003 | .6282 | .000 |
| *Attractiveness* | | | | | | | | |
| Attractiveness after washing hands with soap (1-5) | 3.04 (1.26) | 3.07 (1.27) | 3.90 (0.86) | 4.18 (0.76) | **.0000** | .183 | .0764 | .003 |
| *Nurture* | | | | | | | | |
| Not washing hands with soap is a risk to the health of children (1-5) | 3.28 (1.44) | 3.46 (1.31) | 3.19 (1.49) | 3.78 (1.23) | .2005 | .002 | .0205 | .006 |
| Washing hands with soap to set a good example to children (1-5) | 3.40 (1.33) | 3.49 (1.24) | 3.91 (0.84) | 4.11 (0.76) | **.0000** | .064 | .5147 | .000 |
| *Return* | | | | | | | | |
| Washing hands with soap is worthwhile (1-9) | 7.49 (1.63) | 7.8 (1.35) | 7.69 (1.34) | 7.55 (1.57) | .7603 | .000 | .0124 | .006 |

*Means and Standard Deviations of the Behavioural Determinants for Baseline and Follow-Up in Visitors and Non-Visitors*

| Behavioural factors | Baseline | | Follow-up | | Baseline versus follow-up | | Baseline versus follow-up in visitors and non-visitors | |
|---|---|---|---|---|---|---|---|---|
| | Non-visitors | Visitors | Non-visitors | Visitors | | | | |
| | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *p*-value | Partial $\eta^2$ | *p*-value | Partial $\eta^2$ |
| **Affective beliefs** | | | | | | | | |
| *Liking* | | | | | | | | |
| Like/dislike washing hands with soap (1-9) | 8.06 (1.18) | 8.12 (1.16) | 8.08 (1.01) | 8.27 (0.95) | .1723 | .002 | .3177 | .001 |
| Washing hands with soap is pleasant (1-9) | 7.73 (1.20) | 8.01 (0.93) | 7.94 (0.98) | 7.98 (1.26) | .1884 | .002 | .0623 | .004 |
| *Smell of soap* | | | | | | | | |
| Like/Dislike the smell of hands after using soap (1-9) | 7.66 (1.65) | 7.62 (1.79) | 8.02 (0.99) | 8.19 (0.87) | **.0000** | .029 | .2361 | .001 |
| *Disgust* | | | | | | | | |
| Feeling dirty without washing hands with soap after contact with stool (1-5) | 3.97 (1.24) | 4.25 (1.05) | 4.42 (0.82) | 4.59 (0.66) | **.0000** | .040 | .3963 | .001 |
| Feeling dirty without washing hands with soap before handling food (1-5) | 3.03 (1.54) | 2.92 (1.59) | 3.92 (1.17) | 4.37 (0.79) | **.0000** | .167 | .0009 | .011 |
| Thinking it is disgusting not to wash hands with soap after contact with stool (1-5) | 3.80 (1.31) | 4.17 (1.06) | 3.93 (1.15) | 4.22 (0.98) | .1979 | .002 | .6965 | .000 |
| Thinking that the perfume of the soap spoils the taste of the food (1-5) | 1.23 (0.75) | 1.24 (0.77) | 1.26 (0.79) | 1.35 (1.00) | .1402 | .002 | .4313 | .001 |
| **Norm factors** | | | | | | | | |
| **Descriptive norm** | | | | | | | | |
| *Descriptive norm family* | | | | | | | | |
| Family members who wash hands with soap after contact with stool (1-5) | 4.43 (1.10) | 4.64 (0.94) | 4.50 (0.78) | 4.54 (0.76) | .8506 | .000 | .1671 | .002 |
| Family members who wash hands with soap before handling food (1-5) | 3.56 (1.63) | 3.44 (1.70) | 4.08 (1.09) | 4.34 (0.84) | **.0000** | .066 | .0315 | .005 |
| *Descriptive norm community* | | | | | | | | |
| Community members who wash hands with soap after contact with stool (1-5) | 4.45 (1.02) | 4.62 (0.75) | 4.21 (0.89) | 4.25 (0.83) | .0437 | .012 | .9445 | .000 |
| Community members who wash hands with soap before handling food (1-5) | 3.88 (1.42) | 4.35 (1.14) | 3.90 (1.04) | 4.08 (0.98) | .5513 | .002 | .3873 | .003 |

*Means and Standard Deviations of the Behavioural Determinants for Baseline and Follow-Up in Visitors and Non-Visitors*

| Behavioural factors | Baseline | | Follow-up | | Baseline versus follow-up | | Baseline versus follow-up in visitors and non-visitors | |
|---|---|---|---|---|---|---|---|---|
| | Non-visitors | Visitors | Non-visitors | Visitors | | | | |
| | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *p*-value | Partial $\eta^2$ | *p*-value | Partial $\eta^2$ |
| **Injunctive norm** | | | | | | | | |
| Important people's approval/disapproval to washing hands with soap after contact with stool (1-9) | 7.59 (2.43) | 7.81 (2.24) | 8.07 (1.14) | 8.01 (1.27) | .0059 | .008 | .2631 | .001 |
| Important people's approval/disapproval to washing hands with soap before handling food (1-9) | 7.24 (2.56) | 7.12 (2.60) | 7.71 (1.48) | 7.55 (1.77) | .0006 | .012 | .8836 | .000 |
| Important people thinking one should/should not wash hands with soap after contact with stool (1-9) | 8.29 (1.48) | 8.46 (1.26) | 7.95 (1.33) | 7.94 (1.35) | **.0000** | .026 | .2805 | .001 |
| Important people thinking one should/should not wash hands with soap before handling food (1-9) | 7.83 (1.95) | 7.71 (2.14) | 7.58 (1.63) | 7.72 (1.48) | .2911 | .001 | .2610 | .001 |
| **Personal norm** | | | | | | | | |
| Personal obligation to wash hands with soap after contact with stool (1-5) | 3.76 (1.11) | 3.9 (0.98) | 4.14 (0.79) | 4.19 (0.66) | **.0000** | .035 | .4007 | .001 |
| Personal obligation to wash hands with soap before handling food (1-5) | 3.26 (1.28) | 3.18 (1.27) | 3.64 (1.03) | 3.96 (0.85) | **.0000** | .067 | .0046 | .008 |
| Feeling guilty without washing hands with soap after contact with stool (1-5) | 3.44 (1.37) | 3.72 (1.28) | 3.67 (1.27) | 3.95 (1.15) | .0041 | .008 | .9607 | .000 |
| Feeling guilty without washing hands with soap before handling food (1-5) | 2.83 (1.52) | 2.78 (1.53) | 3.14 (1.30) | 3.77 (0.99) | **.0000** | .057 | **.0001** | .017 |
| **Ability factors** | | | | | | | | |
| **Self-efficacy** | | | | | | | | |
| Feeling always able to wash hands with soap after contact with stool (1-5) | 3.94 (0.94) | 4.08 (0.86) | 4.24 (0.74) | 4.3 (0.72) | **.0000** | .029 | .4741 | .001 |
| Feeling always able to wash hands with soap before handling food (1-5) | 3.64 (1.05) | 3.64 (1.02) | 3.84 (1.00) | 4.10 (0.71) | **.0000** | .030 | .0350 | .005 |
| Feeling certain to always wash hands with soap after contact with stool (1-5) | 3.84 (1.04) | 4.04 (0.88) | 4.16 (0.78) | 4.21 (0.72) | **.0000** | .020 | .2029 | .002 |
| Feeling certain to always wash hands with soap before handling food (1-5) | 3.37 (1.26) | 3.23 (1.26) | 3.67 (1.04) | 3.99 (0.81) | **.0000** | .057 | .0012 | .011 |

*Means and Standard Deviations of the Behavioural Determinants for Baseline and Follow-Up in Visitors and Non-Visitors*

| Behavioural factors | Baseline | | Follow-up | | Baseline versus follow-up | | Baseline versus follow-up in visitors and non-visitors | |
|---|---|---|---|---|---|---|---|---|
| | Non-visitors | Visitors | Non-visitors | Visitors | | | | |
| | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *p*-value | Partial $\eta^2$ | *p*-value | Partial $\eta^2$ |
| **Perceived behavioural control** | | | | | | | | |
| Difficulty to get enough water for handwashing (1-5) | 1.55 (1.10) | 1.50 (1.01) | 1.55 (1.02) | 1.50 (1.09) | .8991 | .000 | .9274 | .000 |
| Difficulty to get enough soap for handwashing (1-5) | 1.55 (1.08) | 1.52 (1.01) | 1.52 (0.96) | 1.53 (0.99) | .8097 | .000 | .8097 | .000 |
| Difficulty to always wash hands with soap after contact with stool (1-5) | 1.53 (1.08) | 1.43 (0.93) | 1.36 (0.91) | 1.49 (1.09) | .4457 | .001 | .0751 | .003 |
| Difficulty to always wash hands with soap before handling food (1-5) | 1.60 (1.11) | 1.48 (0.94) | 1.44 (0.95) | 1.51 (1.05) | .3251 | .001 | .1165 | .003 |
| Difficulty to find the time to wash hands with soap after contact with stool (1-5) | 1.21 (0.63) | 1.21 (0.69) | 1.35 (0.89) | 1.37 (0.96) | .0023 | .009 | .8129 | .000 |
| Difficulty to find the time to wash hands with soap before handling food (1-5) | 1.28 (0.72) | 1.22 (0.58) | 1.44 (0.93) | 1.62 (1.15) | **.0000** | .028 | .0221 | .005 |
| **Response efficacy** | | | | | | | | |
| Certainty that washing hands with soap after contact with stool prevents diarrhoea (1-5) | 3.55 (1.26) | 3.62 (1.20) | 4.10 (0.72) | 4.22 (0.73) | **.0000** | .077 | .7668 | .000 |
| Certainty that washing hands with soap before handling food prevents diarrhoea (1-5) | 3.30 (1.31) | 3.33 (1.28) | 3.84 (0.82) | 4.06 (0.83) | **.0000** | .084 | .1173 | .003 |
| **Maintenance self-efficacy** | | | | | | | | |
| *General hindrance* | | | | | | | | |
| Hindered to wash hands in the last 24 hours (No. of incidents) | 0.14 (0.62) | 0.18 (0.99) | 0.35 (1.13) | 0.36 (1.16) | .0009 | .011 | .6915 | .000 |
| Urgent tasks arose which interfere with handwashing in the last 24 hours (No. of incidents) | 0.11 (0.55) | 0.14 (0.92) | 0.25 (0.95) | 0.21 (0.73) | .0411 | .004 | .4737 | .001 |
| *No water or no soap* | | | | | | | | |
| No water for handwashing in the last 24 hours (No. of incidents) | 0.12 (0.92) | 0.03 (0.34) | 0.22 (0.86) | 0.17 (0.94) | .0310 | .005 | .6474 | .000 |
| No soap for handwashing in the last 24 hours (No. of incidents) | 0.33 (1.92) | 0.49 (2.27) | 0.30 (1.01) | 0.22 (0.85) | .1323 | .002 | .2508 | .001 |
| *Coping self-efficacy* | | | | | | | | |
| Confident to wash hands with soap even if the handwashing facility is far away (1-5) | 3.60 (1.08) | 3.66 (1.12) | 3.80 (0.83) | 3.97 (0.75) | **.0000** | .019 | .3680 | .001 |
| Confident to wash hands with soap even if urgent tasks interfere (1-5) | 3.52 (1.12) | 3.75 (1.02) | 3.80 (0.90) | 3.97 (0.88) | **.0000** | .018 | .6882 | .000 |

*Means and Standard Deviations of the Behavioural Determinants for Baseline and Follow-Up in Visitors and Non-Visitors*

| Behavioural factors | Baseline | | Follow-up | | Baseline versus follow-up | | Baseline versus follow-up in visitors and non-visitors | |
|---|---|---|---|---|---|---|---|---|
| | Non-visitors | Visitors | Non-visitors | Visitors | | | | |
| | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *p*-value | Partial $\eta^2$ | *p*-value | Partial $\eta^2$ |
| Confident to wash hands with soap even if not feeling like it (1-5) | 3.49 (1.19) | 3.66 (1.12) | 3.75 (0.95) | 3.96 (0.96) | **.0000** | .017 | .7004 | .000 |
| *Recovery self-efficacy* | | | | | | | | |
| Confident to start washing hands with soap again (1-5) | 3.61 (1.09) | 3.74 (1.03) | 3.86 (0.90) | 4.04 (0.89) | **.0000** | .021 | .5202 | .000 |
| **Self-regulation factors** | | | | | | | | |
| **Action control** | | | | | | | | |
| Paying attention to not forget washing hands with soap (1-5) | 3.59 (1.13) | 3.64 (1.09) | 3.85 (0.92) | 4.09 (0.88) | **.0000** | .032 | .1145 | .003 |
| Remembering good intentions to wash hands with soap (1-5) | 3.68 (1.25) | 3.93 (1.16) | 3.94 (1.03) | 4.26 (0.77) | **.0000** | .018 | .5742 | .000 |
| Awareness of own goal to wash hands with soap (1-5) | 3.52 (1.09) | 3.60 (1.02) | 3.93 (0.95) | 4.22 (0.81) | **.0000** | .066 | .1108 | .003 |
| **Remembering** | | | | | | | | |
| Forgot to wash hands in the last 24 hours (No. of incidents) | 0.29 (0.98) | 0.40 (1.74) | 0.60 (1.25) | 0.54 (1.34) | .0040 | .009 | .2800 | .001 |
| **Commitment** | | | | | | | | |
| Importance to wash hands with soap after contact with stool (1-5) | 4.07 (1.03) | 4.28 (0.87) | 4.39 (0.80) | 4.44 (0.76) | **.0000** | .019 | .1360 | .002 |
| Importance to wash hands with soap before handling food (1-5) | 3.55 (1.27) | 3.66 (1.15) | 3.99 (1.05) | 4.24 (0.84) | **.0000** | .047 | .3257 | .001 |
| Feeling annoyed without washing hands with soap after contact with stool (1-5) | 3.55 (1.43) | 3.89 (1.24) | 4.07 (1.17) | 4.29 (0.96) | **.0000** | .041 | .3943 | .001 |
| Feeling annoyed without washing hands with soap before handling food (1-5) | 2.70 (1.53) | 2.55 (1.50) | 3.54 (1.40) | 3.94 (1.11) | **.0000** | .145 | .0014 | .010 |
| Committed to washing hands with soap after contact with stool (1-5) | 3.90 (1.07) | 4.12 (0.92) | 4.12 (0.76) | 4.21 (0.64) | .0031 | .009 | .2536 | .001 |
| Committed to washing hands with soap before handling food (1-5) | 3.28 (1.30) | 3.18 (1.33) | 3.68 (1.01) | 4.07 (0.77) | **.0000** | .081 | **.0005** | .012 |
| Trying hard to wash hands with soap (1-5) | 3.58 (1.06) | 3.76 (0.88) | 3.87 (0.78) | 4.05 (0.71) | **.0000** | .026 | .9545 | .000 |

*Note*. *P*-values in bold indicate a significant level of $p < .0006$, after Bonferroni adjustment for multiple comparisons.

# Appendix B: Linear Regression Analyses for Behavioural Determinants explaining Frequencies of Handwashing Behaviour (Household Surveys)

Table B1

*Linear Regression Analysis for Behavioural Determinants Explaining Stool Related Handwashing with Soap*

| | *B* | SE *B* | *β* | *p* | 95% CI (*B*) |
|---|---|---|---|---|---|
| **Risk factors** | | | | | |
| Perceived vulnerability | 0.01 | 0.02 | 0.02 | .635 | [-0.02, 0.04] |
| Perceived severity | 0.00 | 0.01 | 0.01 | .761 | [-0.01, 0.02] |
| Health knowledge | 0.00 | 0.03 | 0.00 | .967 | [-0.07, 0.06] |
| **Attitude factors** | | | | | |
| **Instrumental beliefs** | | | | | |
| Efforts | -0.02 | 0.02 | -0.04 | .296 | [-0.05, 0.02] |
| Attractiveness | -0.09 | 0.03 | -0.14 | **.002** | [-0.15, -0.03] |
| Nurture | 0.05 | 0.02 | 0.14 | **.022** | [0.01, 0.09] |
| Return | -0.01 | 0.03 | -0.02 | .701 | [-0.07, 0.05] |
| **Affective beliefs** | | | | | |
| Liking | 0.03 | 0.03 | 0.07 | .244 | [-0.02, 0.09] |
| Smell of soap | 0.01 | 0.03 | 0.02 | .699 | [-0.04, 0.06] |
| Disgust | 0.06 | 0.03 | 0.16 | **.038** | [0.00, 0.12] |
| **Norm factors** | | | | | |
| Descriptive norm family | 0.21 | 0.06 | 0.22 | **.001** | [0.09, 0.32] |
| Descriptive norm community | 0.07 | 0.05 | 0.08 | .163 | [-0.03, 0.16] |
| Personal norm | -0.01 | 0.03 | -0.02 | .781 | [-0.07, 0.05] |
| **Ability factors** | | | | | |
| Self-efficacy | -0.02 | 0.04 | -0.04 | .564 | [-0.1, 0.06] |
| Response efficacy | 0.10 | 0.05 | 0.10 | **.050** | [0.00, 0.19] |
| Coping self-efficacy | -0.01 | 0.03 | -0.02 | .821 | [-0.06, 0.05] |
| Recovery self-efficacy | 0.01 | 0.08 | 0.02 | .864 | [-0.14, 0.16] |
| **Self-regulation factors** | | | | | |
| Action control | 0.02 | 0.02 | 0.08 | .319 | [-0.02, 0.07] |
| Commitment | 0.06 | 0.03 | 0.25 | **.048** | [0.00, 0.12] |

*Note*. $N$ = 989. Adjusted $R^2$ = 56. CI = Confidence interval. *P*-values in bold indicate a significant level of $p < .05$.

Table B2

*Linear Regression Analysis for Behavioural Determinants Explaining Food Related Handwashing with Soap*

| | *B* | SE *B* | *β* | *p* | 95% CI (*B*) |
|---|---|---|---|---|---|
| **Risk factors** | | | | | |
| Perceived vulnerability | 0.02 | 0.02 | 0.03 | .485 | [-0.03, 0.06] |
| Perceived severity | 0.04 | 0.05 | 0.03 | .449 | [-0.06, 0.14] |
| Health knowledge | 0.00 | 0.01 | -0.01 | .695 | [-0.03, 0.02] |
| **Attitude factors** | | | | | |
| **Instrumental beliefs** | | | | | |
| Efforts | -0.05 | 0.03 | -0.07 | .087 | [-0.10, 0.01] |
| Attractiveness | 0.09 | 0.04 | 0.09 | **.036** | [0.01, 0.18] |
| Nurture | -0.02 | 0.03 | -0.03 | .555 | [-0.08, 0.04] |
| Return | 0.05 | 0.05 | 0.06 | .270 | [-0.04, 0.15] |
| **Affective beliefs** | | | | | |
| Liking | -0.03 | 0.04 | -0.04 | .412 | [-0.11, 0.04] |
| Smell of soap | 0.03 | 0.04 | 0.03 | .385 | [-0.04, 0.10] |
| Disgust | 0.02 | 0.04 | 0.03 | .614 | [-0.06, 0.09] |
| **Norm factors** | | | | | |
| Descriptive norm family | 0.14 | 0.06 | 0.14 | **.023** | [0.02, 0.25] |
| Descriptive norm community | 0.17 | 0.06 | 0.18 | **.003** | [0.06, 0.29] |
| Personal norm | 0.15 | 0.05 | 0.27 | **.001** | [0.06, 0.23] |
| **Ability factors** | | | | | |
| Self-efficacy | 0.05 | 0.05 | 0.07 | .321 | [-0.05, 0.15] |
| Response efficacy | 0.06 | 0.06 | 0.05 | .282 | [-0.05, 0.18] |
| Coping self-efficacy | -0.04 | 0.04 | -0.08 | .412 | [-0.12, 0.05] |
| Recovery self-efficacy | 0.03 | 0.11 | 0.02 | .823 | [-0.20, 0.25] |
| **Self-regulation factors** | | | | | |
| Action control | 0.06 | 0.03 | 0.13 | .083 | [-0.01, 0.13] |
| Commitment | 0.03 | 0.03 | 0.10 | .320 | [-0.03, 0.10] |

*Note*. $N$ = 989. Adjusted $R^2$ = 68. CI = Confidence interval. *P*-values in bold indicate a significant level of $p < .05$.

# Appendix C: Self-Reported Handwashing Behaviour and Behavioural Determinants (School Surveys)

Table C1

*Percentage of Children Reporting Washing Hands with Soap for Baseline and Follow-up by WinS and Control Schools*

| | | Baseline | | Follow-up | |
|---|---|---|---|---|---|
| | | WinS | Control | WinS | Control |
| | | % | % | % | % |
| When you are at school, do you wash your hands with soap and water after using the toilet? | Yes | 99 | 98 | **94** | **46** |
| When you are at school, do you wash your hands with soap and water before you eat? | Yes | **99** | **93** | **95** | **51** |
| Yesterday (or your last day) at school, did you wash your hands after using the toilet? | Yes | **97** | **91** | **97** | **42** |

*Note*. Percentages in bold indicate a significant difference between WinS and Control Schools at a level of $p < .001$, after Bonferroni adjustment for multiple comparisons.

Table C2

*Distribution of Answers in Percentages to the Behavioural Determinants for Baseline and Follow-up by WinS and Control Schools*

| | | Baseline | | Follow-up | |
|---|---|---|---|---|---|
| | | WinS | Control | WinS | Control |
| | | % | % | % | % |
| How much do you like washing hands with soap and water? | Don't like it | 6 | 2 | 6 | 4 |
| | Somewhat like it | 7 | 8 | 6 | 6 |
| | Like it very much | 88 | 90 | 88 | 90 |
| Do you think that washing hands with soap and water takes a lot of effort? | Takes no effort | 51 | 46 | 57 | 63 |
| | Takes some effort | 8 | 29 | 16 | 17 |
| | Takes much effort | 41 | 25 | 28 | 20 |
| How strongly do you try to wash hands with soap and water? | Not strongly | 24 | 22 | 18 | 14 |
| | Somewhat strongly | 7 | 13 | 15 | 35 |
| | Very strongly | 69 | 65 | 67 | 51 |
| When you think about the last 24 hours, how often did it happen that you intended to wash hands with soap and water and then forgot to do so? | …times<br>*M* (*SD*) | 1.07<br>(1.96) | 0.80<br>(1.76) | 1.16<br>(1.58) | 1.09<br>(1.33) |
| When you think about the last 24 hours, how often did it happen that you intended to wash hands with soap and water, but were hindered in doing so? | …times<br>*M* (*SD*) | 1.16<br>(2.10) | 0.68<br>(1.70) | 1.03<br>(1.43) | 0.72<br>(1.40) |

*Distribution of Answers in Percentages to the Behavioural Determinants for Baseline and Follow-up by WinS and Control Schools*

| | | Baseline | | Follow-up | |
|---|---|---|---|---|---|
| | | WinS | Control | WinS | Control |
| | | % | % | % | % |
| How confident are you that you can wash hands with soap and water even if you do not feel like handwashing? | Not confident | 10 | 13 | 14 | 9 |
| | Somewhat confident | 14 | 14 | 13 | 31 |
| | Very confident | 76 | 74 | 73 | 60 |
| Imagine you have stopped washing hands with soap and water for several days, for example because there was no water for handwashing. How confident are you to start washing hands again? | Not confident | 6 | 5 | 8 | 7 |
| | Somewhat confident | 10 | 16 | 20 | 29 |
| | Very confident | 84 | 79 | 72 | 63 |
| How high do you feel is the risk that you get diarrhoea? | No risk | 20 | 13 | 15 | 12 |
| | Some risk | 29 | 29 | 25 | 41 |
| | Very high risk | 52 | 58 | 60 | 47 |
| Imagine you contracted diarrhoea, how severe would be the impact on your life? | Not severe at all | 13 | 11 | 12 | 10 |
| | Somewhat severe | 23 | 24 | 21 | 36 |
| | Very severe | 64 | 66 | 67 | 54 |
| Do you wash your hands with soap and water after using the toilet automatically? | Not automatically | 10 | 12 | 9 | 11 |
| | Somewhat automatically | 9 | 11 | 11 | 15 |
| | Very automatically | 81 | 77 | 81 | 75 |
| Do you feel committed to wash hands with soap and water after using the toilet? | Not committed | 19 | 19 | 15 | 8 |
| | Somewhat committed | 13 | 12 | 11 | 26 |
| | Very committed | 68 | 69 | 74 | 66 |
| Do you feel dirty if you don't wash hands with soap and water after using the toilet? | Don't feel dirty | 16 | 20 | 16 | 15 |
| | Feel somewhat dirty | 12 | 8 | 9 | 12 |
| | Feel very dirty | 72 | 71 | 75 | 73 |
| How many people of your family wash hands with soap and water after using the toilet? | Nobody | 2 | 5 | 4 | 8 |
| | A few | 6 | 9 | 12 | 12 |
| | Everybody | 93 | 87 | 84 | 80 |
| How many children of your school wash hands with soap and water after using the toilet? | Nobody | 3 | 4 | **3** | **22** |
| | A few | 15 | 20 | **16** | **27** |
| | Everybody | 82 | 76 | **81** | **52** |
| Do your teachers teach you to wash your hands with soap and water after using the toilet? | Nobody thinks I should | 2 | 4 | **3** | **14** |
| | A few think I should | 5 | 12 | **7** | **18** |
| | Everybody thinks I should | 93 | 85 | **90** | **68** |
| Would you feel guilty if you did not wash hands with soap and water after using the toilet? | Not guilty | 8 | 12 | 9 | 5 |
| | Somewhat guilty | 13 | 13 | 15 | 17 |
| | Very guilty | 79 | 76 | 76 | 78 |
| Do you think you are able to always wash hands with soap and water after using the toilet? | Not able | 11 | 9 | 6 | 6 |
| | Somewhat able | 12 | 17 | 12 | 18 |
| | Very able | 78 | 74 | 82 | 76 |
| In general, how difficult is it to always wash hands with soap and water after using the toilet? | Not difficult | 73 | 69 | 69 | 63 |
| | Somewhat difficult | 10 | 10 | 14 | 26 |
| | Very difficult | 17 | 22 | 17 | 11 |

*Note*. Percentages in bold indicate a significant difference between WinS and Control Schools at a level of $p < .001$, after Bonferroni adjustment for multiple comparisons.

# Appendix D: Detailed Description of the School Facilities

***WinS Schools***

**Jalalpur (Gwalior, MP)**

Baseline: 28/08/12 / Follow-up: 03/12/12

Pit latrines were at the students’ disposal with separate cabins for girls and boys. Most of the toilets were either locked or full to capacity. The condition of the superstructure was reasonable with some cracks. The floor was cracked and unswept. In general, the toilet facilities were not clean. Boys practiced open defecation, while girls used the pit latrines. There was no means of washing hands inside the toilet building, nor was water available in the school’s grounds. A hand pump for handwashing was located at the nearby temple, about 200 – 300 metres away from the toilet facilities. In both the baseline and follow-up observation, children reported that they went to the nearby temple to wash their hands before having lunch. At the time of the baseline investigation, soap was not available on a regular basis and it was only available on the day of the observation. At follow-up, there was a bar of soap at the hand pump for handwashing before lunch, which was observed to be used by all children. No tippy tap was observed at follow-up.

**Change between baseline and follow-up:** No change was seen in the infrastructure from baseline to follow-up. At baseline, the toilets were generally reported to be less clean than at the time of the follow-up.

**Mao (Gwalior, MP)**

Baseline: 30/08/12 / Follow-up: 30/11/12

Pit latrines were available with separate cabins for girls and boys. All the toilets were locked and used only by the teachers. Children practiced open defecation. On the day of the observation, the toilets were unlocked. At a second unexpected visit, the toilets were locked again and no soap was no longer available. The condition of the superstructure was reasonable with some cracks. The floor was cracked and soiled. No means of washing hands inside the toilet building were found. A hand pump was placed on the school ground. Soap was unavailable on a regular basis, but the teachers had placed it by the hand pump at the time of the observation and children were told to line up and wash their hands with it. On the day of the follow-up, toilets were cleaned by the school children. Due to the cleaning session, the toilets were cleaner at the time of the follow-up visit. No tippy tap was observed at follow-up.

**Change between baseline and follow-up:** No change in infrastructure.

**Jamahar (Gwalior, MP)**

Baseline: 31/08/12 / Follow-up: 04/12/12

There was only one toilet incorporating one pit latrine and one urinal. Some children reported that it was always locked; others said that it was sometimes accessible. The condition of the superstructure was reasonable with some cracks. The floor was cracked and unswept. In general, the toilet was fairly clean. Children practiced open defecation. Most probably the teachers used the facilities for themselves only. Primary school toilets were out of use and very dirty. There was only one functional toilet for 230 middle school children, 140 primary school children, and 150 secondary school children. There was no means of washing hands inside the toilet building, but there was a hand pump in the school’s

grounds. Soap was not available. Children reported that there was a designated time period allotted for students to wash their hands before eating. No tippy tap was observed at follow-up.
**Change between baseline and follow-up:** No change in infrastructure or cleanliness.

**Dudhiya (Indore, MP)**
Baseline: 12/09/12 / Follow-up: 16/11/12
The superstructures, as well as the floors were tatty and dilapidated. The toilet facilities were in general not clean. There were pit latrines and open pits without any means of washing hands inside the toilet building. A hand pump was located far away (more than 10 paces) from the toilets. Soap was not available. It remained unclear whether there was a designated time period allotted for students to wash their hands before having lunch. At follow-up, one tippy tap was discovered. However, it was empty and without soap.
**Change between baseline and follow-up:** Infrastructure did change (tippy tap). Cleanliness did not change.

**Devguradia (Indore, MP)**
Baseline: 05/09/12 / Follow-up: 08/11/12
Separate toilets and urinals for boys and girls were available. Students reported that usually only two cabins were open. No means of washing hands could be found inside the toilet building, but there was a hand pump in the school grounds. During the observation soap was obtainable, but after some time it vanished. Students reported that there is a bar of soap at lunch time for handwashing. The condition of the superstructure was reasonable with some cracks. The floor was cracked and soiled. In general the toilets were fairly clean. At the time of the follow-up, the toilets were judged not to be clean. It was observed that not even the head teacher washed his hands after going to the toilet. No tippy tap was observed at follow-up.
**Change between baseline and follow-up:** No change in infrastructure, cleanliness decreased.

**Sanawadiya (Indore, MP)**
Baseline: 07/09/12 / Follow-up: 09/11/12
Pit latrines with separate cabins for girls and boys were available. About half of the toilets were locked. The condition of the superstructure was reasonable with some cracks. The floor was cracked and unswept. In general, the toilets were not clean and some had a strong smell of urine. No means were available for washing hands inside the toilet building. A hand pump was installed in the school grounds. Soap was not available on a regular basis, only on the day of the observation. Children reported that there was a designated time period allotted for them to wash their hands before eating. It has been observed that the head teacher and also other teachers used the toilet without washing their hands afterwards. At follow-up, the hand pump was broken and no tippy tap was observed.
**Change between baseline and follow-up:** Change in infrastructure (hand pump broken). Cleanliness did not change.

**Bihadiya (Indore, MP)**
Baseline: 07/09/12 / Follow-up: 10/11/12
Communal cabins with pit latrines were at the students’ disposal. The toilets were not clean and there was a strong smell inside building. Four new cabins were under construction. The water tank for handwashing was located inside another building. Most probably the water was only used for handwashing before lunch. Other than this there was no place for handwashing. Children reported that

soap was available at the water tank, that there was no soap in the school’s grounds. At the follow-up visit, no functional toilets could be found and all the cabins were locked. No tippy tap was observed at follow-up.
**Change between baseline and follow-up:** No change was seen in infrastructure or cleanliness, except for the closed cabins at the time of the follow-up.

**Mundla Dostdar (Indore, MP)**
Baseline: 11/09/12 / Follow-up: 16/11/12
Pit latrines were available and the superstructure was reasonable with some cracks. The floor was dilapidated and dirty. In general the toilet facilities were not clean. Furthermore they appeared unused. Leaves were rotting inside the cabins which were locked. New cabins were under construction. There was no means of washing hands inside the toilet building. There was a hand pump at the other side of the school’s grounds. Soap was not available. There was a designated time period allotted for students to wash their hands before eating, but with water only. By the time of the follow-up, there were two functional toilets, but they were very dirty and full of waste. Of the two hand pumps, only one was working because the ground water level was too low. No tippy tap was observed at follow-up.
**Change between baseline and follow-up:** Infrastructure changed. Cleanliness did not change

**Sangod: Girls upper primary (Kota, RJ)**
Baseline: 17/09/12 / Follow-up: 19/11/12
The superstructure was well maintained, roofed, and recently painted. The floors were solid and very clean. The toilet facilities contained pit latrines and were in general clean. Means of washing hands inside the toilet building were available, but there was no soap. The main source of water for handwashing was piped water inside the school building. There was a designated time period allotted for students to wash their hands before eating. No tippy tap was observed at follow-up.
Change between baseline and follow-up: Infrastructure did not change, neither did cleanliness.

**Sangod: Upper primary (Kota, RJ)**
Baseline: 17/09/12 / Follow-up: 20/11/12
The superstructure was well maintained, roofed, and recently painted. The floors were solid and very clean. The toilet facilities were in general clean. There were pit latrines, but no means of washing hands inside the toilet building. Piped water was available near the toilets. Soap was not available at baseline. There was a designated time period allotted for students to wash their hands before eating. At the time of the follow-up there was soap, but no tippy tap.
**Change between baseline and follow-up:** Infrastructure as well as cleanliness did not change. Soap was present at follow-up.

***Control schools***

**Jamunia (Indore, MP)**
Baseline: 08/09/12 / Follow-up: 16/11/12
There were urinals and pit latrines with separate cabins for girls and boys. Some were unused without a known reason. A hand pump was located at the other end of the school grounds. Soap was only available before lunch. The cabins of the boys were very dirty with a strong smell. During the observation, the teachers started cleaning the toilets with the school children. The superstructure was reasonable. At the time of the follow-up, the superstructure had been recently built, but the toilets were not in use. The floor was cracked and soiled. In general the facilities were not clean. Children reported to

almost never wash their hands before lunch. There were two functional hand pumps, but they were placed far away from the toilets. Alcohol bottles were found in the toilet. Soap was not available.
**Change between baseline and follow-up:** Infrastructure changed. Cleanliness did not change.

**Rajdhara (Indore, MP)**
Baseline: 11/09/12 / Follow-up: 16/11/12
The superstructure was reasonable with some cracks. The floor was cracked and unswept. In general, the toilet facilities were fairly clean. There were pit latrines and one accessible communal urinal. Two toilets were locked and one toilet was under construction. There was no means of washing hands inside the toilet building but there was a hand pump near the toilet. Soap was only available before and after lunch. At the time of the follow-up, the toilet facilities were clean.
**Change between baseline and follow-up:** Infrastructure did not change, but cleanliness did improve.

**Kurar (Kota, RJ)**
Baseline: 20/09/12 / Follow-up: 21/11/12
The condition of the superstructure was reasonable with some cracks. The floors were cracked and unswept. The toilet facilities in general can be described as fairly clean. Pit latrines were available. Some of the toilets were overgrown or locked. There was no means of washing hands inside the toilet building, but there was a tube well. It was observed that not even teachers washed hands after using the toilet. Children practiced open defecation. Soap was not available. There was no designated time period allotted for students to wash their hands before eating. At the follow-up, a strong smell was noticed around the toilet facilities and faeces were spread on the pathway between the facilities and the school.
**Change between baseline and follow-up:** Infrastructure did not change. Cleanliness also did not change.

**Khajoori (Kota, RJ)**
Baseline: 21/09/12 / Follow-up: 23/11/12
The condition of the superstructure was reasonable with some cracks. Pit latrines were available. Taps could be found, but they were out of order. There was a hand pump located in the school grounds. Soap was only available between 10:00 am and 10:30 am. There was a designated time period allotted for students to wash their hands before eating. At the second visit, soap was also only available at lunch time.
**Change between baseline and follow-up:** Infrastructure did not change, neither did cleanliness.

**Khajoori private school (Kota, RJ)**
Baseline: 22/09/12 / Follow-up: 23/11/12
No toilet facilities were found. Children practice open defecation. A water tank was found inside the schoolyard, but there was no soap available.
**Change between baseline and follow-up:** Infrastructure did not change, neither did cleanliness.